



Manning Valley Coastal Zone Management Plan

January 2018

VERSIONS.

TITLE	VERSION	DATE	STATUS
MANNING VALLEY COASTAL ZONE MANAGEMENT PLAN	1	February 2017	Reviewed November 2016 version. Updated May 2017.
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	4	January 2018	Current - incorporated feedback from OEH and Department of Industry Crown Lands & Water. Sent for Certification 19 January 2018.

SUMMARY

MANNING VALLEY COASTAL ZONE MANAGEMENT PLAN

OUR COAST

Beaches, headlands, littoral rainforests, dunes, creeks and estuaries are all key assets of the Manning Valley coastline. Locals and visitors alike flock to these places to enjoy swimming, walking, surfing and many other recreational and relaxation activities.

The beaches vary from urbanised environments like Diamond Beach and Crowdy Bay Harbour to long strips of natural coastline like Harrington Beach and Crowdy Bay.

The key assets of the coastline are the heart of the coastal villages in the Manning Valley. These villages have their own unique beach cultures and local economies with the impressive coast line as the natural backdrop.

COASTAL HAZARDS AND RISKS

The interaction of waves, winds, tides and sea levels on our coast are extremely complex. During storms these interactions can impact on beach users and landowners. Storm waves and tides may cause erosion and the loss of land, while wave overwash can inundate land and assets behind the beach.

For the purpose of this coastal zone management plan:

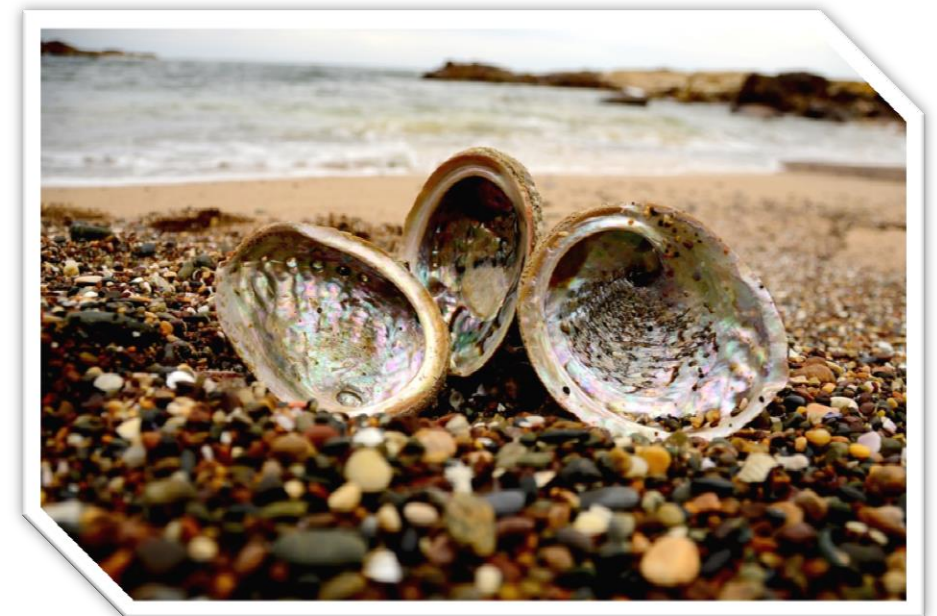
- “hazard” refers to one or more of these coastal processes; and
- “risk” is the probability that harm or damage might occur as a result of one or more of these coastal processes.

The frequency and intensity of coastal hazards are expected to increase in the future and therefore our exposure to coastal risk is also expected to increase.

WHAT'S AT RISK

Coastal erosion, recession, instability and wave overwash threaten the beaches, dunes and community assets behind the beach. Community assets at risk include a mix of built, natural and recreational assets such as access tracks, car parks, nature reserves, important habitat, roads, stormwater outlets, sewer and water services. In some places even private land and houses are at risk.

Coastal dunes provide a vital buffer against erosion that often provide protection to land and assets behind the beach. Damage to dune vegetation by pedestrians, 4WDs, and beachfront residents reduces the ability of a dune to capture and store sand, reducing the storm buffer provided by the dunes.



HOW ARE COASTAL RISKS MANAGED?

MidCoast Council has prepared this Coastal Zone Management Plan to outline what steps are needed to manage the coastal risks in the Manning Valley now and into the future.

The NSW Government supports Council in its preparation of such plans. NSW legislation sets out the legal process for preparing coastal zone management plans. This process requires the coastal zone management plan to define the coastal 'risks' (or hazards), the timeframes over which to define the risks (i.e. present day, 2060 and 2100), and to suggest a range of options to address the coastal risks.

MidCoast Council has followed this legislated process to prepare the Coastal Zone Management Plan. As a first step, the potential for coastal risks to affect beaches in the Manning Valley was investigated. The following plans were commissioned to ascertain coastal hazards:

- Coastal Hazard Definition Study (2010)
- Coastline Management Study (2010)
- Greater Taree Coast Emergency Action Plan (2011)
- Coastal Zone Management Plan (2013)
- Coastal Zone Management Plan - GTCC Executive Summary (2014)
- Greater Taree Coastal Zone Management Plan (September 2015) - [Rescinded by this report].

Once the hazards were identified practical management options for managing present and future risks on beaches in the Manning Valley were considered.

The final step has been to prepare this Manning Valley Coastal Zone Management Plan. This documents the preferred actions to manage coastal risks over the next 5-10 years.

AREA COVERED BY THE COASTAL ZONE MANAGEMENT PLAN

The Manning Valley Coastal Zone Management Plan (CZMP) covers the area between Black Head in the south and Crowdy Bay / Diamond Head in the north (Refer to Table 1 and Map 1). This plan excludes the beaches of Old Bar and Manning Point, as these beaches will have a dedicated Coastal Management Program created to identify and address issues for this specific area.

ACTIONS IN THE COASTAL ZONE MANAGEMENT PLAN

The Manning Valley CZMP is focussed on actions over the next 5 - 10 years to manage presently known risks and improve our ability to manage future risks.

Actions range from monitoring the response of beaches during storm events and enhancing dune vegetation, through to identifying assets that can be repaired, replaced, relocated or removed, should they be impacted by coastal processes in the future. Assets include paths, parks, carparks, viewing platforms, picnic tables and other minor community facilities.

There are generally two approaches for asset management that relate to coastal processes, both of which have positive and negative impacts. The approaches are either to:

- "accept" the impact and loss of land, and shift or remove assets so that the beach can retreat, retaining a sandy beach; or

- “protect” the asset at risk, with beach nourishment, interim measures such as sand scraping or other hard engineering structures.

Actions can be extremely costly, and use of hard engineering structures can reduce the width and amenity of the beach.

ACTIONS FOR PRIVATE PROPERTIES

Providing clear and consistent development planning controls for private properties is a key action recommended by this CZMP.

The development planning controls guide the design of new structures or renovations to existing structures to reduce their exposure to coastal risks. For the majority of properties within an area affected by coastal hazards, the development controls are manageable.

Properties located immediately adjacent to the beach are at higher risk due to their proximity to the ocean. Development controls for these locations may be stricter; but the aim will be to facilitate the safe use and occupation of properties, in response to the coastal hazard affecting the property.

While the CZMP recommends that development controls need to exist for the coastal area, this document does not detail these planning controls. This information is contained within the Greater Taree Development Control Plan (DCP) 2010 (as amended). This has been done so that property applicants and Council assessment officers are referring to the DCP to understand the criteria that a development must meet.

MANAGING FUTURE RISKS

It is acknowledged that some risks may not eventuate for some time. Identifying management options for these risks enables Council and others to be prepared should a high risk situation present. This precautionary approach allows for well-planned and costed approaches to be mapped out.

COMMUNITY INVOLVEMENT IN THE CZMP

Members of the community and visitors alike have been invited to contribute to the development of this plan (formerly known as the Greater Taree CZMP) through several public exhibition periods and community briefing sessions.

These opportunities for contribution were advertised via media releases, paid advertisements, flyers, posters, direct emails and mailed letters to residents.

WHAT NEXT

Following adoption by Council and certification of this plan by the NSW Minister for the Environment, actions in the plan will be undertaken.

This plan will be reviewed after 5 - 7 years. The review will consider how effective the implemented actions have been, against coastal processes and coastal risks. Additional studies in this field will be reviewed and the plan updated with new coastal data, including any monitoring data that details changes on the coast.

In this manner, this plan is an ever evolving document. The document aims to continually improve our understanding of and management in response to coastal processes and risks.

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1. INTRODUCTION

MidCoast Council (Council) with advice and assistance from the NSW Office of Environment and Heritage (OEH) resolved to prepare a Coastal Zone Management Plan (CZMP) for the beaches of the Manning Valley, within the MidCoast Local Government Area (LGA).

This CZMP intends to:

- identify and address the risks to assets and land from coastal processes through the development and implementation of management actions
- develop objectives and actions that manage community use, coastal amenity and ecological health

The main coastal hazards addressed by this CZMP are:

- erosion of the beach and dunes during storms;
- recession (or retreat) of the shoreline under current conditions,
- additional recession due to projected sea level rise,
- inundation and overtopping of coastal barriers by ocean waves during storms, and
- slope instability

For the purpose of this coastal zone management plan:

- “hazard” refers to one or more of these coastal processes; and
- “risk” is the probability that harm or damage might occur as a result of one or more of these coastal processes.

The above coastal hazards may threaten roads, associated public assets, coastal amenity, beach access and private dwellings.

Previous storm periods have shown that significant beach erosion and the inundation of land surrounding local creeks is likely. It is expected that the frequency and severity of these hazards will increase in the future and therefore our exposure to coastal risk is also expected to increase.

1.1 OBJECTIVES OF THE MANNING VALLEY CZMP

The objectives of the Manning Valley CZMP have been developed following consultation with the community during the preparation of the former Greater Taree CZMP.

The objectives of the plan are to:

- **Provide** safe and reliable public access to our beaches
- **Enable** the community and community groups to support / assist in the management of our coastline
- **Ensure** coastal process information and adaptation is readily accessible to the community and to private property owners

1.2 AREA COVERED BY THIS CZMP

This plan focuses on the coast zone from Crowdy Bay, south to Hallidays Point (see Table 1 and Map 1), with the public land management arrangements detailed in Table 2.

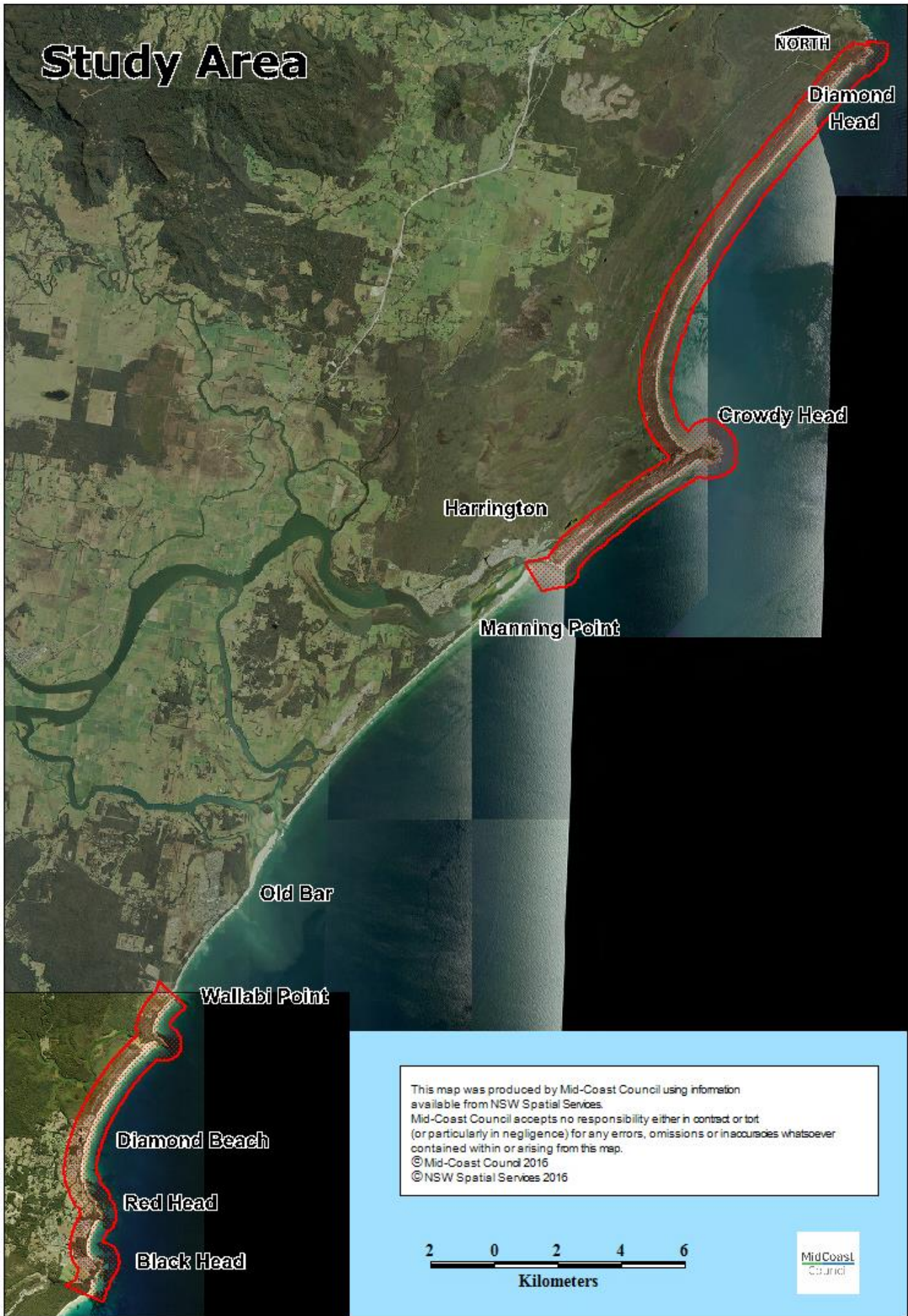
The beaches of Old Bar and Manning Point are not included in this Plan, as they will be the subject of a separate Coastal Management Program, as directed by the *Coastal Management Act 2016*.

Location	Description	Hazard Mapped / defined
Nine Mile Beach <small>(North end)</small>	This CZMP refers to the northern most 200m of this beach immediately to the south of Blackhead. This section of beach is exposed to the south-east with Blackhead headland sheltering it from the north. Though this section has a low dune profile, it is considered to be in a stable condition with periods of accretion. In this section there are two separate pedestrian beach access points and a combined pedestrian and vehicles access point.	Erosion Wave run up
Black Head / Red Head Beach	Is a 1.4km long east to south-east facing beach within Black Head Bay. Presently the beach is relatively stable, sedimentary compartment with minor long term accretion. Isolated locations of minor historical recession (0.0 m/year) have occurred in the central to northern portion of the beach, possibly due to a combination of persistent rips, an offshore reef concentrating wave energy and anthropogenic changes associated with pedestrian access. The long term minor accretion is likely to be due to leaky bypassing around Black Head supplying sediment from the south (Nine Mile Beach). At the southern end of the beach is Black Head Lagoon which is an Intermittently Closed and Open Lake and Lagoon (ICOLL). Anecdotal evidence suggests that the Lagoon opens four to six times a year, however at the time of this report, it is closed.	Dune blow out Erosion Wave run up
Diamond Beach	Is a 5.5km long east to south-east facing beach. Generally stable with minor, long term recession occurring in the south (0.1m/yr) and north (0.2m/yr). The beach has been relatively stable in the centre in recent times, however, the presence of exposed indurated sands; 'soft rock' or 'coffee rock' is evidence of recession in the past. There is little net longshore drift along this part of the NSW coastline therefore the amount of sediment moving in and out of the embayment is small. Opening onto the beach on the south side of Saltwater Point is Saltwater Lagoon (the entrance to Khappinghat Creek). This natural lagoon is classed as an Intermittently Closed and Opened Lake and Lagoon (ICOLL).	Erosion Recession Wave run up
Saltwater Beach	Is a 1.3km long south-east facing beach. It is a relatively closed system. It has experienced historical recession of 0.2 m/year in the central portion and is generally stable at the ends where it is tied to headland and reef structures. Minor long term sediment loss is likely to be due to leaky bypassing of Wallabi Point to the north or offshore losses during less frequent storm events.	Recession Erosion
Harrington Beach	Is a 5.6km long south-east facing beach. The beach has historically shown stability, with a net increase in sand deposition occurring between 1965 and 2006. Harrington Beach is supplied with sand from the Harrington entrance bar. The shape of the southern portion of the beach is determined by wave diffraction patterns in the lee of the northern training wall which makes it stable.	Erosion Recession Wave run up
Harrington Inlet	The Manning River is one of only two deltas in the southern hemisphere with two river entrances, the main entrance being at Harrington in the north and the second at Farquhar Inlet to the south. In a hydraulic sense the dual entrance is 'reticulated' around the common tailwater of the ocean. Disturbance at one entrance, such as construction of a seawall, can be reflected in compensatory erosion or deposition in the other inlet. The permanently open Harrington entrance has settlements on both sides. There is a breakwall located on the northern side which was constructed in the early 1900s to improve safety for boats traversing the bar	Erosion Recession Wave run up
Crowdy Bay Beach	Changes to the coastline at Crowdy Bay (Crowdy Head to Diamond Head) have not been analysed. The majority of land within Crowdy Bay forms part of the Crowdy Bay National Park and is managed by the NSW National Parks & Wildlife Services.	Erosion Recession Wave run up
Crowdy Bay Harbour	Is an all-weather deep-water boat access. Management generally of this harbour and surrounding Crown Land comes under the Manning Entrance State Park Trust jointly managed by Council and the NSW Department of Industry - Crown Lands & Water. Council undertakes periodic dredging of the boat ramp to remove accumulated sand from interfering with the operation of the ramp and the NSW Department of Industry – Crown Lands & Water undertakes dredging of the harbour when required and resources permit.	Erosion Recession Wave run up

TABLE 1. DESCRIPTION OF AREA COVERED BY THIS PLAN

Location	Description
Nine Mile Beach <small>(North end)</small>	Nine Mile Reserve adjacent to the coast (R57335) is under Trust Management of Greater Taree Holiday and Leisure Reserves Reserve Trust, gazetted 25 July 1924 for public recreation and preservation of native flora. This reserve is managed by MCC.
Black Head / Red Head Beach	Black Head / Red Head Reserve, adjacent Main Street (R97994) is under Trust Management of Greater Taree Holiday and Leisure Reserves Reserve Trust, gazetted 18 November 1985 for public recreation and environmental protection. This reserve is managed by MCC.
Diamond Beach	Diamond Beach Reserve adjacent coast (R97994) is under Trust Management of Greater Taree Holiday and Leisure Reserves Reserve Trust, gazetted 15 November 1985 for public recreation and environmental protection. This reserve is managed by MCC.
Saltwater Beach	Saltwater Beach is contained within the Saltwater National Park. Saltwater National Park is a declared Aboriginal Place and is jointly managed by the local Aboriginal community and the NSW National Parks & Wildlife Service.
Harrington Beach	Harrington Beach (R1014609), within the Harrington Beach State Park, is under the management of Harrington Beach State Park Trust (joint management MCC and DoI Crown Lands & Water). Gazetted 7 March 2008.
Harrington Inlet	Harrington Inlet (R1014609), within Harrington Beach State Park, is under the management of Harrington Beach State Park Trust (joint management MCC and DoI Crown Lands & Water). Gazetted 7 March 2008. Boat Ramp (Licence No:376000 General) Council, Wharf (Licence No:316649 General) Council, Gantry (DoI Cown Lands & Water).
Crowdy Bay Beach	Crowdy Bay Beach (R1014609), within Harrington Beach State Park, is under the management of Harrington Beach State Park Trust (joint management MCC and DoI Crown Lands & Water). Gazetted 7 March 2008. R1012108, Manning Regional Crown Reserve (No Trust). R89406 (No Trust), gazetted 11 April 1975
Crowdy Bay Harbour	Crowdy Bay Harbour (R1014609), within the Harrington Beach State Park, is under the management of Harrington Beach State Park Trust (joint management MCC and DoI Crown Lands & Water). R210107, gazetted 28 June 1996 (No Trust). Port Assets within the Harbour Jetty No.1 (North), Jetty No.2 (South), Unloading Wharf, Revetment Wall & Slipway. Boat ramp occurs on Crown land managed by the Manning Entrance State Park Trust. Under Manning Entrance State Park Trust (MESP Trust) arrangements, the boat ramp is managed by MidCoast Council.

TABLE 2. PUBLIC LAND MANAGEMENT ARRANGEMENTS.



MAP 1 - STUDY AREA. MANNING CZMP

1.3 PREPARATION OF THE CZMP

The NSW Minister for the Environment adopted the *Guidelines for Preparing Coastal Zone Management Plans* (July 2013), under section 55D of the *Coastal Protection Act 1979*. Coastal councils are to prepare draft plans in accordance with these guidelines.

This CZMP will detail the coastal risks, community uses of the coastal zone and coastal ecosystems. To further demonstrate how this CZMP has complied with these guidelines, refer to the reference table provided in Appendix 1. Following adoption by Council and certification of this plan by the NSW Minister for the Environment, actions in the plan will be undertaken. This plan will be reviewed after 5 - 7 years.

1.3.1 STUDIES THAT SUPPORT THIS CZMP

The guidelines require coastal zone management plans to define the coastal hazards, the timeframes over which to define the hazard (i.e. present day, 2060 and 2100), and to suggest a range of options to address any associated coastal risks that may occur within 5 to 10 years of the CZMP being made.

MidCoast Council has followed this legislated process to prepare this CZMP. As a first step, the potential for coastal hazard was investigated. The following plans were commissioned to ascertain coastal hazards:

- Coastal Hazard Definition Study (2010)
- Coastline Management Study (2010)
- Greater Taree Coast Emergency Action Plan (2011)
- Coastal Zone Management Plan (2013)
- Coastal Zone Management Plan - GTCC Executive Summary (2014)
- Greater Taree Coastal Zone Management Plan (September 2015)

[Rescinded by this report, as per Part 4A Division 1 Section 55I (1&2) of the *Coastal Protection Act 1979*].

As outlined in Table 2 above, where coastal reserves are under the management of the DoI Crown Lands & Water, this CZMP supports and refers actions to existing Reserve Plans of Management for maintenance

works. Where new actions are proposed, reference should be made to these PoMs to ensure aim of proposed actions meets the plan and conforms with Crown Lands Act.

1.3.2 SEA LEVEL RISE

Under the *NSW Coastal Protection Act 1979*, the NSW Government requires all coastal councils to prepare CZMPs that propose management options to address risks from coastal hazards.

A CZMP is required to estimate coastal recession as a result of storm events and sea level rise, as well as identifying the management options that can be undertaken to address the areas affected by these naturally occurring processes.

The first stage of this work, to identify the risks associated with coastal processes, was undertaken via the preparation of a Coastline Hazard Definition Study (WorleyParsons 2010). The main hazards identified by this study were long term recession due to sediment loss and sea level rise.

The hazards identified by the study were then graphically represented by establishing hazard lines on coastline maps, which have been condensed in subsequent documents to the following mapped areas:

- immediate hazard line (area currently at risk from storm events);
- 2060 year hazard line (area that could be lost due to erosion and recession over this time period); and
- 2100 year hazard line (area that could be lost due to erosion and recession over this time period).

The main factor in determining these lines is anticipated sea level rise and the impact that may have on coastal erosion and recession. For most of our coastline, excluding Old Bar and Manning Point Beaches, the 2060 and 2100 year hazard lines have been established as a result of projected sea level rise (see Appendix 2).

The sea level rise figures used to support this CZMP were originally based on the figures produced by the CSIRO, which were used as the basis for the State Government's Sea Level Rise Policy Statement 2009 (no longer supported by the State). These were an increase above 1990 mean sea levels of 40cm by the year 2050 and a rise of 90cm by the year 2100.

The anticipated levels of sea level rise and associated impacts will be monitored over time, to see whether projections change to a degree significant enough to warrant remodelling of the hazard lines.

1.3.3 COASTAL HAZARD DEFINITION STUDY

The Coastal Hazard Definition Study (WorleyParsons 2010) was used to understand the coastal processes that impact this section of coast during the preparation of this CZMP.

The 2010 Coastal Hazard Definition Study shows the immediate hazard line, the 2060 hazard line and the 2100 hazard line. The Study also identified the built assets within these areas of hazard.

Methodology for assessment of erosion/recession hazards (Worley Parsons, 2010) was based on a simplifying and conservative assumption of a beach system comprising unconsolidated uniform sand. Along much of the coast this is a reasonable first-pass approach that provides a conservative capture of coastal properties which may be affected by erosion and recession processes. Unfortunately, this approach leaves the erosion/recession lines undefined in denser soils adjacent to headlands and other rocky features.

In order to construct a logical 'coastal planning area' for planning assessment purposes this CZMP has extended the modelled lines to tie off at the ends of beaches and thus provide an identifiable limit to the erosion/recession hazard. This was undertaken by an empirical site interpretation based on soil depth and outcropping of hard rock. Details of the interpolation methodology are provided in Appendix 2.

1.3.4 COASTAL RISK ASSESSMENT

The interaction of waves, winds, tides and sea levels on our coast are extremely complex. During storms these interactions can impact on beach users and landowners. Storm waves and tides may cause erosion and the loss of land, while wave overwash can inundate land and assets behind the beach.

For the purpose of this coastal zone management plan:

- "hazard" refers to one or more of these coastal processes; and
- "risk" is the probability that harm or damage might occur as a result of one or more of these coastal processes.

The frequency and intensity of coastal hazards are expected to increase in the future and therefore our exposure to coastal risk is also expected to increase.

The CZMP uses a risk management approach by:

- identifying the areas likely to be affected by coastal erosion and recession now and into the future (from the Hazard Study); and
- specifying actions that will be taken in regard to existing development and the implementation of controls to manage the risk to future development.

Public safety risks have been identified and considered in relation to management options. The GTCC Coast Emergency Action Plan 2011 details how risks will be managed during and after storm events.



1.3.5 RISK ASSESSMENT RESPONSES

With the exception of some properties along Jubilee Parade, Diamond Beach, the majority of the coast covered by this plan is currently identified as having a low coastal erosion risk even within the immediate hazard area. Although this risk is anticipated to increase over time as the impacts of sea level rise becomes more noticeable. This plan details the need to observe this impact and revise the plan accordingly over time.

The understanding of the current and future risks along the coast has prompted the development of the actions identified in Section 2 of this report. These actions were developed by considering the objectives and principles of the *NSW Coastal Policy 1997*. In addition, actions were developed to meet the objectives of the *Coastal Protection Act 1979* relating to the management of the coastline now and into the future. Actions were identified by review of current and planned management practices, through a series of workshops with internal Council stakeholders. These actions were enhanced through by workshops with identified Government agency stakeholders.

Due to the low risk nature of the beaches covered by this CZMP, this plan has had no need to identify locations where landowners could construct coastal protection works. This situation will be reviewed when this CZMP is converted into a CMP (by 2021) if erosion is experienced.

Further, this plan does not propose the construction of new public coastal protection works. Where maintenance works on existing locations to provide continued resilience has been identified, management options call for investigation studies to be commissioned. (Black Head SLSC; Crowdy Head Harbour; Harrington northern breakwall, training wall and spur wall).

Where management actions are being carried out by Council as the public authority under section 55C(2) (b) of the *Coastal Protection Act 1979*, Council has the responsibility of the implementation of that action, from the design, to costing and identification of the funding source, to timeframe of implementation. Where works are on Crown land, then authorisations under the Crown Lands Act 1989 are likely to be required. In addition, consents and authorisations may be required under other legislation, including *Native Title Act 1993 (Cth)*, *Aboriginal Land Rights Act 1983 (NSW)* and *Commonwealth Native Title Act 1993*.

Identified works from this plan will be included in Council's Delivery Program and Operational Plans and hence will be monitored and reported on through Council's Integrated Planning and Reporting (IP&R) framework.

Where the coastal processes begin to pose a higher risk to public infrastructure and usage of this infrastructure, a review of this plan is required. Otherwise, this plan will be reviewed in 2021, as stipulated by the new *Coastal Management Act 2016*.

1.3.6 EMERGENCY ACTION PLAN

The GTCC Coast Emergency Action Plan 2011 details the actions required to manage the risk to public safety during and after storm events. This CZMP outlines the risks associated with our changing coastline to public safety and assets. The actions identified in the CZMP provide for continued public access to beaches and improved facilities.

It has been identified that additional chapters are required to be added to the Emergency Action Plan to manage specific actions around identified locations within this plan. Council is committed to updating the Emergency Action Plan by 2021.

1.3.7 BEACH USE AND ACCESS

The beach and their headlands are widely used for an array of recreational activities, the experienced gained from this use is highly valued by the community. It is acknowledged that coastal processes in this study area will have the greatest impact on beach access and use.

Access to the beach following a storm event is identified as being the most likely and frequent form of impact, within the study area. As such, actions within this CZMP have been designed with a focus on retaining formal beach access as well as improving associated infrastructure such as carparks and viewing platforms.

Informal beach access points have been identified as an issue as they can create the potential for beach erosion and have a negative impact on flora and fauna through a lack of vegetation connectivity.

As a key focus, Council will work collaboratively with residents, the community and relevant public authorities, for example the NSW Department of Industry – Crown Lands & Water (DoI Crown Lands & Water) to rationalise and reduce the number of unlawful beach accesses along our coastline. A community education program will be an important component of this work.

1.3.8 CULTURAL HERITAGE

The traditional owners of the land within the study area are the Biripi Aboriginal people with the exception being around Blackhead which was also used by the Worimi people. Many Aboriginal sites (e.g. scarred trees, artefact scatters, shell middens, stone tool manufacturing sites and ceremonial sites) are located in coastal areas of the LGA. A number of Aboriginal burial sites occur along beaches (Klaver & Keffernan 2009). Artefacts including ‘flakes’, remnant ‘cores’ and ‘stone axes’ have also been recorded (Orogen 2007).

The predominant area of occupation by the Biripi people was around Old Bar/Wallabi Point through to Saltwater Reserve. The majority of artefacts found within the former Greater Taree Local Government Area have been recorded in this area.

Saltwater National Park is a declared Aboriginal Place and is jointly managed by the local Aboriginal community and the NSW National Parks & Wildlife Service. Partnerships between the Aboriginal community and Council have also been established to promote cultural heritage for specific sites.

A large amount of the European heritage for the area is focused inland, however, where present along the coast, these places are recognised and have a level of protection granted to them as a heritage item in the Greater Taree Local Environmental Plan 2010. Heritage signage has been established across the LGA to promote a better understanding of heritage in the area.

1.3.9 COASTAL ECOSYSTEMS

To ensure that the health status of the estuaries of the Manning Valley that fall into the study area of this CZMP are adequately addressed, the following plans were commissioned:

- Manning River Estuary Processes Study 1997;
- Manning River Estuary Management Study 2009;
- Manning River Estuary Management Plan 2009; and
- Manning River Estuary Management Plan Implementation Schedule – 2014 Update

These plans identify the health and suggest management option to improve the estuaries in the study area. Proposed management actions align with section 55C of the *Coastal Protection Act 1979*.

Further, Council has partnered with the NSW Office of Environment & Heritage to undertake water quality monitoring throughout each year (commenced in 2013) to provide a report card grade on the health of the Manning Estuary.

Coastal ecosystems such as dunal areas are subject to additional pressures aside from impacts during storm events. These additional pressures include exotic weed invasion, altered fire regimes, trampling and illegal removal of vegetation. This CZMP includes actions for all beach compartments to undertake management of natural assets through bush regeneration and weed control.



1.3.10 COMMUNITY CONSULTATION

To ensure that key issues on the coast are known and understood, community and stakeholder consultation was undertaken based on the May 2017 version of this document. As a part of this process all associated documents were placed on public exhibition in accordance with the *Coastal Protection Act 1979* and displayed for a period of no less than 21 days. The public exhibition period was held over 29 days from Friday 26 May to Friday 23 June 2017.

During the public exhibition, members of the community were invited to contribute to the development of this plan through several community information sessions, which were held at the following venues and times:

- Harrington Multi-purpose Centre
 - Tuesday 30 May 2017 – 10am to 2pm
- Old Bar Surf Life Saving Club
 - Wednesday 31 May 2017 – 10am to 1pm
 - Tuesday 6 June 2017 – 4pm to 6pm
- Black Head Surf Life Saving Club
 - Thursday 1 June 2017 – 10am to 1pm
 - Wednesday 7 June 2017 – 4pm-6pm

These opportunities for contribution were advertised via media releases, paid advertisements, flyers and posters. In addition to these methods, over 5,700 letters were sent to landowners to advise of the exhibition of the document and opportunities to meet with staff and lodge a submission.

Council staff spoke with approximately 150 people who attended the drop-in sessions. Additionally, staff received many phone enquiries, particularly from absentee landowners, as well as counter enquiries

Feedback and formal submissions received from the community and stakeholders has been reviewed and used to develop the fundamental principles that underpin this version of the Manning Valley CZMP.

Formal submissions were received from the (former) MidCoast Water supporting the plan (20 June 2017), and from Dol Crown Lands and Water requesting minor amendments to highlight public land management arrangements (14 July 2017).

Community enquiries predominately commenced with concern for private property. Following articulation of the low risk to private property, secondary concern related to the future management of formal beach access locations and proposed pedestrian walkways (Harrington). The majority of these enquires were received during the open community information sessions. Council staff present at these sessions spoke with the residents and explained the relevant parts of the plan to answer questions. No formal submissions were received from the community requesting alterations to this plan.



2. IDENTIFICATION OF AFFECTED AREAS

An assessment of the coast within the study area was undertaken within the Black Head to Crowdy Head Coastal Hazard Definition Study (Worley Parsons, 2010) in order to understand the range of coastal hazards that could be anticipated from present day, to 2060 and 2100. This Study then identified specific areas and assets of the coast that would be at risk from these coastal processes. Incorporating input from NSW Office of Environment & Heritage (OEH), the following hazard lines were adopted, capturing risk combinations to be considered in planning provisions, management actions and investment decisions.

Immediate Hazard Line: is based on the occurrence of an extreme ocean storm under current sea level conditions (approximately 2010). It is an estimate of the location of the hazard line (slumped escarpment) following a 1974 type storm, often called the Sygna Storm (26 May, 1974). This yellow line is included on mapping within this CZMP and represents the eastern most point at which Council is likely to consider approval of development (except for any private coastal management works).

2060 Hazard Line: is based on an extreme storm (as above) occurring around 2060 under the added influence of long term recession and projected sea level rise to 2060. The line's position is determined by application of the Bruun rule to account for sea level rise and the Nielsen Slope Stability Model. This blue line is included in mapping within this CZMP and is being used to inform the identification of a coastal planning area where development controls are to be applied, as detailed in the Greater Taree Development Control Plan 2010 (as amended).

2100 Hazard Line: is based on an extreme storm (as above) occurring around 2100 under the added influence of long term recession and projected sea level rise to 2100. High-range (0.9m) sea level rise projections were mapped using the Bruun Rule and Nielsen Slope Model, as above and is represented as the red line in the mapping within this CZMP.

The 2100 hazard line is important as it accords with longer term planning standard more applicable to longer term developments such as urban infrastructure and public buildings. For most private developments the

Building Code of Australia encompasses a 50 year planning horizon (representing the minimum 'lifetime expectation' of a building).

On most of these beaches the main driver of shoreline adjustment is projected sea level rise and the impact that may have on coastal erosion. As most Manning Valley beaches show a low background recession rate (excluding Old Bar and Manning Point), the 2060 and 2100 year hazard lines largely reflect a response to projected sea level rise.

Sea level rise data utilised in draft versions of this CZMP were originally based on the figures produced by the CSIRO, also used as the basis for the former State Government's Sea Level Rise Policy Statement 2009. These projections represent an increase above 1990 mean sea levels of 40cm by the year 2050 and a rise of 90cm by the year 2100.

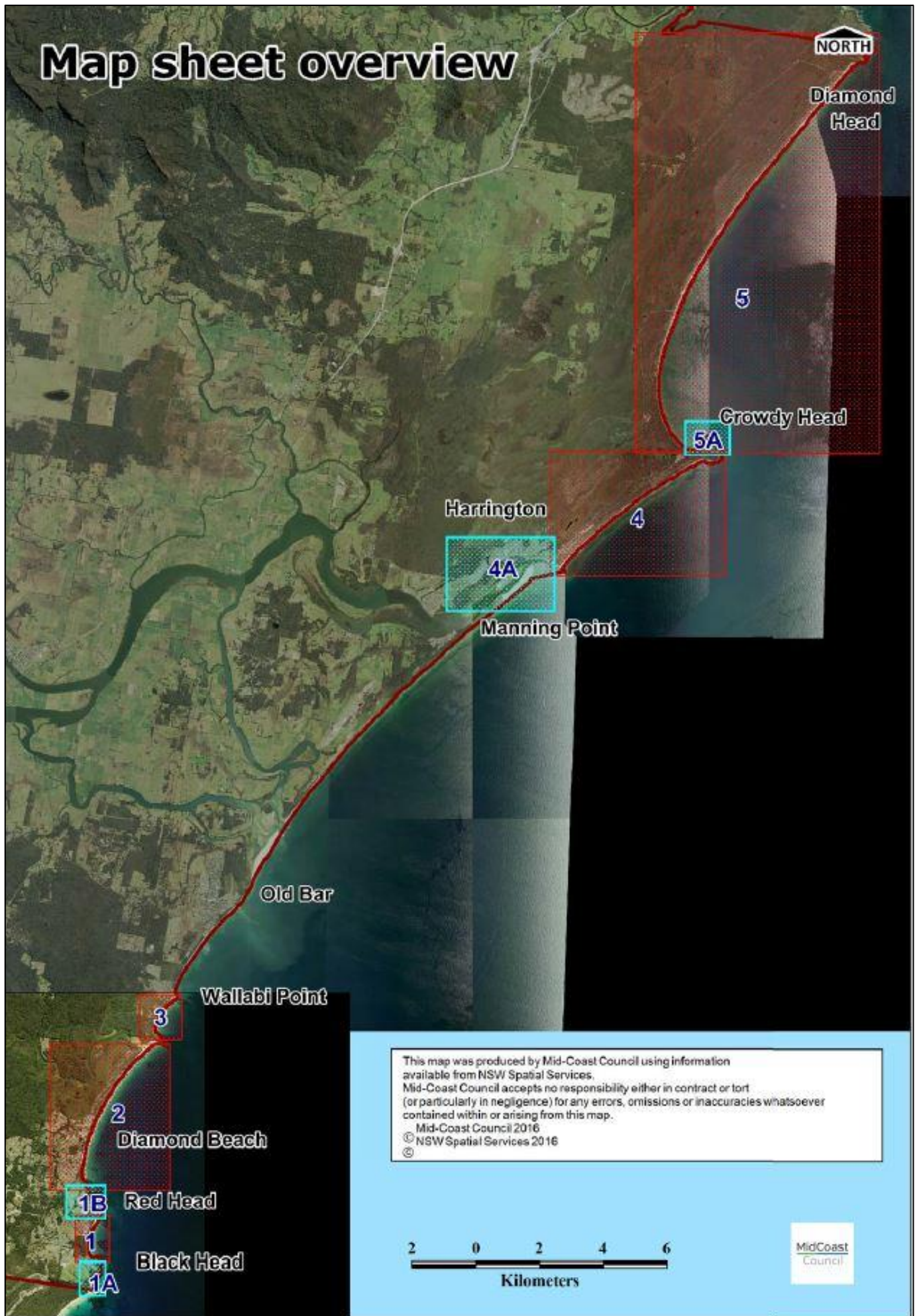
The hazard lines represent a likely location of a slumped erosion scarp at each particular time under specific assumptions. Inherent subsurface instability is likely to be associated with such scarps and needs to be considered in the stability of footings and foundations of adjacent structures.

Coastal inundation risks were also identified for some properties upstream of Black Head Lagoon. Further investigation of combined catchment and coastal flooding is recommended as part of a comprehensive stormwater management study (see Section 2.1.1 below).

Previous Council adopted CZMPs have been reviewed along with the associated Black Head to Crowdy Head Coastal Hazard Definition Study (Worley Parsons, 2010). On open beaches erosion escarpments are assumed to form in mostly unbound dune sand. This is a conservative approach which can lead to inaccuracies around headlands where there is usually sub or outcropping rock. As a consequence the hazard lines have been modified to capture the effect of the more durable materials around headlands. In particular these modifications have direct effects at the headlands associated with Black Head, Read Head, Diamond Beach, Saltwater and Wallabi Point.

This reassessment of hazard lines has been undertaken through direct field interpretation using observed and estimated depth to durable rock to logically terminate the lines (see Appendix 2).

Map sheet overview



MAP 2 - MAP OVERVIEW

2.1 NINE MILE, BLACK HEAD AND RED HEAD BEACHES

2.1.1 ASSETS AFFECTED - NINE MILE, BLACK HEAD AND RED HEAD BEACHES

The following table lists assets that could be affected by coastal processes as identified in Maps 3, 4, 5 & 6 below. These assets have been identified from the projected hazard lines. Development of the hazards lines is stated in section 2 above.

Location	Immediate	2060	2100
Black Head to Red Head	Black Head SLSC (Boat ramp / revetment) and Rock Pool	Black Head SLSC and associated assets including boat ramp and rock pool	Beach front row of cabins, Big 4 Holiday Park, Red Head
	Stormwater outlets to Black Head Lagoon entrance	Beach access points	Stormwater drain, Red Head
	Sewerage Pumping station adjacent to Black Head Lagoon	Stormwater outlet Black Head Lagoon entrance	Black Head SLSC and associated assets including boat ramp and rock pool
	Park facilities adjacent to Black Head Lagoon	Sewerage Pumping station adjacent to Black Head Lagoon	Stormwater outlet Black Head Lagoon entrance
	Pedestrian Bridge over Black Head Lagoon	Park facilities adjacent to Black Head Lagoon	Sewerage Pumping station adjacent to Black Head Lagoon
	Main Street, Black Head (between Surfview and Ocean Street)	Pedestrian Bridge over Black Head Lagoon	Park facilities adjacent to Black Head Lagoon
	Beach access points	Sewer mains along the reserve, Main Street, Black Head	Pedestrian Bridge over Black Head Lagoon and beach access points
			Sewer mains along the reserve, Main Street, Black Head

TABLE 3. ASSETS AFFECTED NINE MILE, BLACK HEAD AND RED HEAD BEACHES.

2.1.2 MANAGEMENT ACTIONS - NINE MILE, BLACK HEAD AND RED HEAD BEACHES

It is understood that a combination of management actions are required when coping with the challenges of coastal processes. The following table outlines actions that MidCoast Council, will undertake in the Nine Mile, Black Head and Red Head area. (Where indicated, Council will work with identified agency in relation to action). (Where indicated, identified actions will have funding sourced from identified Council budgets. Where indicated "grant funding" refers to funding being applied from an external grant funding source. No specific funding source has been identified as not to restrict potential funding sources, however, the OEH Coast and Estuary grants have been identified as a main source of grant funding potential). See Appendix 3 for alternative layout of management actions

Location	Immediate Actions	Medium / Long term Actions
<p>Nine Mile / Black Head / Red Head Beaches</p>	<p>Commission a feasibility study focused on the redesign of the structure on the ocean side of Black Head SLSC to improve its resilience. (est. \$25,000 grant funding) [IA1]</p>	<p>Review data gathered from available science, including the beach monitoring data, to ensure CZMP / CMP actions are up to date and relevant. (MCC Natural Systems budget partial grant funding if required) [MLA1]</p>
	<p>Liaise with Black Head SLSC committee to explain coastal hazard processes, management actions and outcomes of feasibility study. (MCC Community Spaces budget) [IA2]</p>	<p>Continue liaisons with Big 4 Holiday Park regarding their management of identified asses and future management of the Holiday Park and asset protection zones. (MCC Natural Systems budget) [MLA2]</p>
	<p>Commission a specific Emergency Action Plan for Black Head Beach formal access points, Black Head Rock Pool, Black Head Lagoon Pedestrian Bridge, Black Head park facilities and Red Head formal beach access points. Focus on re-establishing public access post storm event. Where public infrastructure is on land or under the ownership/management of DoI Crown Lands & Water, consult with DoI Crown Lands & Water as part of assessment and planning processes and in accordance with MoU (where applicable). Prior to the implementation of any actions, there may be the need to obtain authorisations under the Crown Lands (est. \$15,000 grant funding) [IA3]</p>	<p>Continue to review and update Council LEP and DCP in relation to coastal risk planning and management. Review to consider and align with any changes or amendments to State Environmental Planning Policy (Coastal Management) and the Coastal Management Act 2016. (MCC Strategic Planning Budget) [MLA3]</p>
	<p>Manage Black Head Lagoon, Reserve and stormwater outlets in accordance with the Black Head Lagoon Entrance Plan of Management 2008. (MCC Projects & Engineering budget. New Capital may require grant funding)[IA4]</p>	<p>Review management of Main Street Black Head (between Albert and Ocean Street). (MCC Projects & Engineering budget) [MLA4]</p>

Location	Immediate Actions	Medium / Long term Actions
<p data-bbox="98 213 416 277">Nine Mile / Black Head / Red Head Beaches</p>	<p data-bbox="448 213 1245 277">Review flood mapping to establish potential impacts on Black Head Lagoon. <i>(MCC Projects & Engineering budget) [IA5]</i></p>	<p data-bbox="1292 165 2112 331">Continue to implement management options towards retention, replacement or removal of public infrastructure, as per findings from internal assessment of assets in hazard zones. <i>(MCC Community Spaces budget partial grant funding if required) [MLA5]</i></p>
	<p data-bbox="448 362 1245 461">Commence discussions in relation to the future management of the sewer mains and sewer pumping station adjacent to Black Head Lagoon. <i>(MCC Water Services budget) [IA6]</i></p>	<p data-bbox="1292 378 2013 445">Review and update specific Emergency Action Plans, if necessary. <i>(est. \$15,000 grant funding) [MLA6]</i></p>
	<p data-bbox="448 512 1256 713">Engage a contractor to develop and implement a beach condition monitoring program. To focus on sand volume changes, potential wave run up impacts. Aim to improve data for future revision of coastal hazards studies and trigger points for Emergency Action Plans. <i>(est. \$45 - 60,000 grant funding) [IA7]</i></p>	<p data-bbox="1292 563 2152 662">Develop long term plans for management of the sewer mains and sewerage pumping station adjacent to Black Head Lagoon. <i>(MCC Water Services budget) [MLA7]</i></p>
	<p data-bbox="448 786 1261 952">Commence review and implementation of Council LEP and DCP in relation to Coastal Risk Planning and management. Review to consider and align with State Environmental Planning Policy - Coastal Management and the Coastal Management Act 2016. <i>(MCC Strategic Planning budget) [IA8]</i></p>	<p data-bbox="1292 770 2130 968">Implement actions as recommended by feasibility study into the redesign of the structure on the ocean side of Black Head SLSC to improve its resilience. Continue to liaise with the Black Head SLSC committee in relation to management options, beach access and storm responses. <i>(grant funding cost est. to be confirmed) [MLA8]</i></p>
	<p data-bbox="448 1032 1267 1437">Develop assessment criteria for the replacement or upgrade of public infrastructure in the study area. Assessment to determine requirements for construction of new or replacement of existing structures with appropriate materials. Consideration to be given to the requirement for removal of structures due to impact of coastal processes. Where public infrastructure is on land or under the ownership/management of DoI Crown Lands & Water, consult with DoI Crown Lands & Water as part of assessment and planning processes and in accordance with MoU (where applicable). Prior to the implementation of any actions, there may be the need to obtain authorisations under the Crown Lands <i>(est. \$60,000 grant funding) [IA9]</i></p>	<p data-bbox="1292 1150 2157 1316">Develop Asset Management Plan for Black Head SLSC and Black Head Rock pool in relation to impacts from predicated coastal processes. AMP should consider balance point of replacement of and removal of asset. <i>(MCC Property & Commercial services budget partial grant funding if required) [MLA9]</i></p>

Location	Immediate Actions	Medium / Long term Actions
<p>Nine Mile / Black Head / Red Head Beaches</p>	<p>Working collaboratively with residents and relevant agencies e.g. DoI Crown Lands & Water to reduce the number of informal beach accesses along the coast through dune restoration programs, aimed at revegetating with native species. Liaison with adjoining property owners in relation to the need to use formalised access points. <i>(grant funding cost est. to be confirmed) (liaise with Greater Taree Holiday and Leisure Reserves Reserve Trust) [IA10]</i></p>	<p>Develop a Coastal Natural Asset Strategy focusing on bush regeneration and weed control for the continued enhancement of biodiversity in the coastal zone. <i>(MCC Natural Systems budget partial grant funding if required) [MLA10]</i></p>
	<p>Develop and implement weed management action plan with relevant land managers. With the aim to reduce weed invasion to improve native vegetation resilience. <i>(MCC Natural Systems budget) [IA11]</i></p>	<p>Regularly review education packages focused on private properties at risk of coastal process. Packages should clearly articulate options private residents can undertake for the management of their properties. <i>(MCC Natural Systems budget) [MLA11]</i></p>
	<p>Continue to enhance strong partnership with the Hallidays Point Landcare, the DoI Crown Lands & Water, NSW National Parks & Wildlife Service and the Office of Environment and Heritage. <i>(MCC Natural Systems budget) [IA12]</i></p>	
	<p>Develop and implement community education program to support above listed works. <i>(grant funding cost est. to be confirmed) [IA13]</i></p>	
	<p>Commence liaisons with Big 4 Holiday Park regarding their management of identified asses and future management of the Holiday Park including asset protection zones. <i>(MCC Natural Systems budget) [IA14]</i></p>	
	<p>Review CZMP actions by 2021 <i>(grant funding cost est. to be confirmed) [IA15]</i></p>	

TABLE 4. MANAGEMENT ACTIONS - NINE MILE, BLACK HEAD AND RED HEAD BEACHES

Map sheet 1A

NORTH

Black Head

Pedestrian


Pedestrian (boardwalk)

Pedestrian

Vehicle/Pedestrian (no northern vehicle access allowed)

Legend:

 Beach access

 Walking trails

50 0 50 100 150
Metres

Satellite Imagery extract from 0.6m pan-sharpened imagery
flown May - October 2005.
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MidCoast
Council

MAP 3 - NINE MILE BEACH.

Map sheet 1

NORTH

Red Head

Refer Red Head Inset

Pedestrian (viewing platform above)

Pedestrian

Pedestrian

Pedestrian (access from Bayel Drive residential area)

Legend:

- Beach access
- Immediate hazard line
- Coastal hazard line - 2060
- Coastal hazard line - 2100
- - - Walking trails

Refer Black Head Inset

Pedestrian

Pedestrian

Public beach boat ramp

Source imagery derived from 0.6m pan-sharpened imagery from May - October 2000. Copyright Digital Globe Inc.

Black Head



MAP 4 - BLACK HEAD AND RED HEAD BEACHES

Map sheet 1- Insets



MAP 5. BLACK HEAD RED HEAD BEACHES INSERT.



MAP 6. RED HEAD HEADLAND (SEASCAPE)

2.2 DIAMOND BEACH

2.2.1 ASSETS AFFECTED - DIAMOND BEACH

The following table lists assets that could be affected by coastal processes as identified in Maps 7 & 8 below. These assets have been identified from the projected hazard lines. Development of the hazards lines is stated in section 2 above.

Location	Immediate	2060	2100
Diamond Beach	Beach access points along Jubilee Pde	Estimated 28 properties on seaward side of Jubilee Pde.	Estimated 28 properties on seaward side of Jubilee Pde.
	Council reserve south end Jubilee Pde.	Estimated 2 properties on Dune Springs Close	Estimated 2 properties on Dune Springs Close
		Beach front cabins and structures, within Diamond Beach Resort northern end Jubilee Pde.	Beach front and third row of cabins and associated structures, within Diamond Beach Resort.
		Stormwater outlet to creek	Stormwater outlet to creek
		Carpark at end of Diamond Drive	Carpark at end of Diamond Drive
		Seaward edge of lots between the holiday park and Ramada Beach Resort	Holiday Units, Diamond Beachfront, Diamond Beach Rd (most easterly house / unit as well as eastern end of accommodation block)
		Council reserve south end of Jubilee Pde.	Diamond Beach Resort (most buildings at the easterly end, plus eastern end of building parallel to Diamond Beach Rd)
			Seashells Beach Resort - front of resort building (seaward part of building)
			Seashells Beach Resort - House / buildings on northern side of the Seashells Resort main building
			Ramada Beach Resort - most seaward buildings
			Water main along Jubilee Pde
			Water main to Diamond Beach Resort and Diamond Beach Holiday Units
		Jubilee Pde.	

TABLE 5. ASSETS AFFECTED DIAMOND BEACH.

2.2.2 MANAGEMENT ACTIONS - DIAMOND BEACH

It is understood that a combination of management actions are required when coping with the challenges of coastal processes. The following table outlines actions that MidCoast Council will undertake in the Diamond Beach area. *(Where indicated, Council will work with identified agency in relation to action). (Where indicated, identified actions will have funding sourced from identified Council budgets. Where indicated "grant funding" refers to funding being applied from an external grant funding source. No specific funding source has been identified as not to restrict potential funding sources, however, the OEH Coast and Estuary grants have been identified as a main source of grant funding potential). See Appendix 3 for alternative layout of management actions*

Location	Immediate Actions	Medium / Long Term Actions
Diamond Beach	Develop and implement education packages focused on private properties at risk of coastal process. Packages should clearly articulate options private residents can undertake for the management of their properties in accordance with new <i>Coastal Management Act 2016</i> provisions. <i>(grant funding cost est. to be confirmed) [IA16]</i>	Review data gathered from available science, including the beach monitoring data, to ensure CZMP / CMP actions are up to date and relevant. <i>(MCC Natural Systems budget partial grant funding if required) [MLA1]</i>
	Review existing Emergency Action Plan for Jubilee Pde and Diamond Beach formal beach access points. If necessary, create new version retaining focus on re-establishing public access post storm events. Where public infrastructure is on land or under the ownership/management of DoI Crown Lands & Water, consult with DoI Crown Lands & Water as part of assessment and planning processes and in accordance with MoU (where applicable). Prior to the implementation of any actions, there may be the need to obtain authorisations under the Crown Lands. <i>(est. \$15,000 grant funding) [IA17]</i>	Regularly review education packages focused on private properties at risk of coastal process. Packages should clearly articulate options private residents can undertake for the management of their properties. <i>(MCC Natural Systems budget) [MLA11]</i>
	Review management plans for foreshore reserves and stormwater outlets, update if necessary <i>(MCC Transport Assets Budget) (may require input from DoI Crown Lands & Water) [IA18]</i>	Commence liaisons with Diamond Beach Resort and Ramada Resort regarding their management of identified asses and future management of their properties. <i>(MCC Natural Systems budget) [MLA12]</i>
	Review potential impacts on stormwater system within identified area, include in management plans if haven't been previously recorded. <i>(MCC Transport Assets Budget) [IA19]</i>	Continue to review and update Council LEP and DCP in relation to coastal risk planning and management. Review to consider and align with any changes or amendments to Coastal Management State Environmental Planning Policy (SEPP) Coastal Management and the <i>Coastal Management Act 2016</i> . <i>(MCC Strategic Planning Budget) [MLA3]</i>
	Review future management of the water mains and sewerage pumping stations in Diamond Beach <i>(MCC Water Services budget) [IA20]</i>	Continue to implement management options towards retention, replacement or removal of public infrastructure, as per findings from internal assessment of assets in hazard zones. <i>(MCC Community Spaces partial grant funding if required) [MLA5]</i>

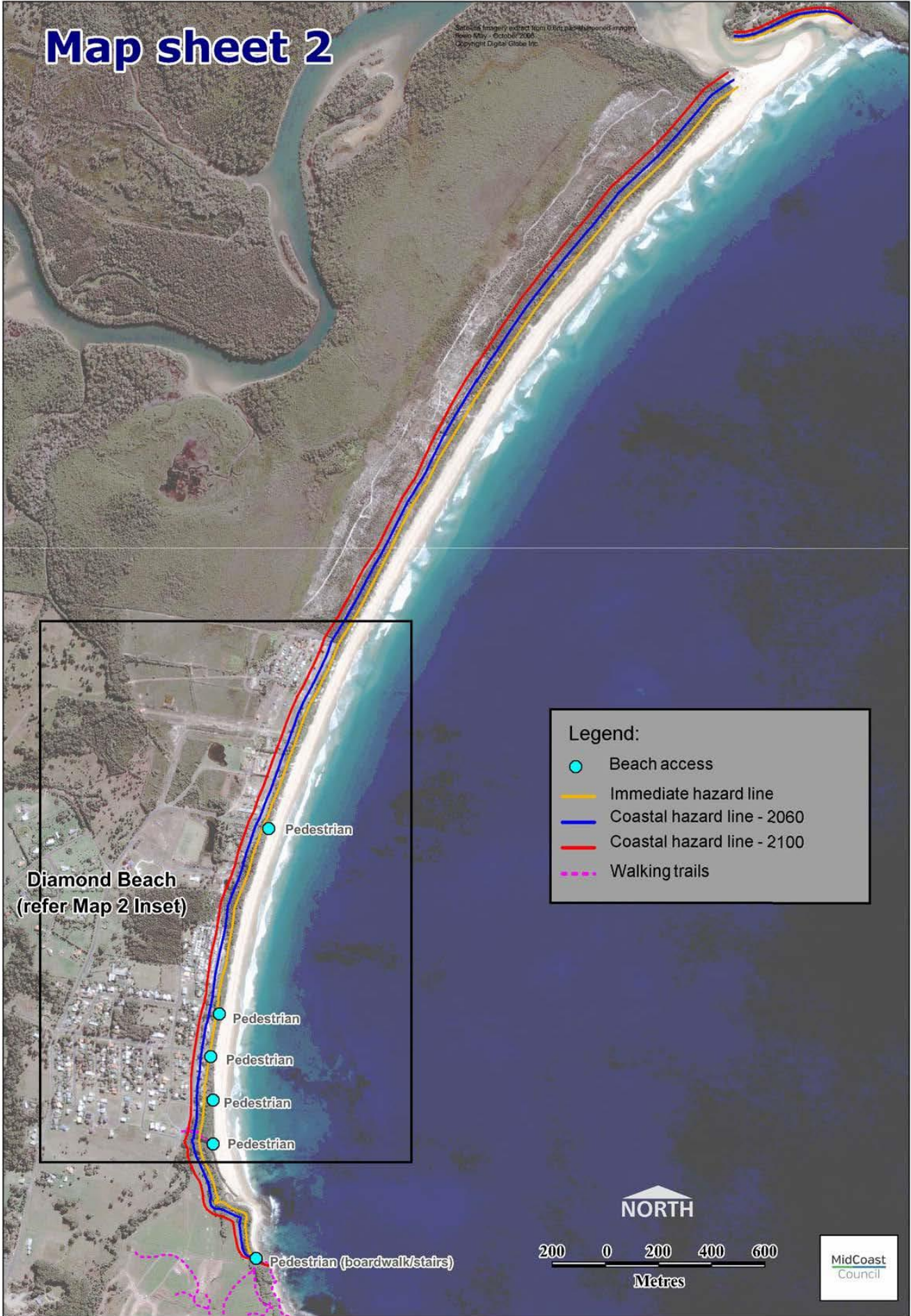
Location	Immediate Actions	Medium / Long Term Actions
Diamond Beach	<p>Engage a contractor to develop and implement beach condition monitoring program. To focus on sand volume changes, potential wave run up impacts. Aim to improve data for future revision of coastal hazards studies and trigger points for Emergency Action Plans. <i>(est. \$45 - 60,000 grant funding) [IA7]</i></p>	<p>Review and update of Emergency Action Plan for Diamond Beach and Jubilee Pde. <i>(est. \$15,000 grant funding) [MLA13]</i></p>
	<p>Commence review and implementation of MidCoast Council LEP and DCP in relation to coastal risk planning and management. Review to consider and align with State Environmental Planning Policy - Coastal Management and the <i>Coastal Management Act 2016. (MCC Strategic Planning budget) [IA8]</i></p>	<p>Review management of the water mains and sewerage pumping stations in Diamond Beach. <i>(in-kind cost) [MLA14]</i></p>
	<p>Develop assessment of replacement or upgrade to public infrastructure in the study area. Assessment to determine requirements for construction of new or replacement of existing structures with appropriate materials. Consideration to be given to the requirement for removal of structures due to impact of coastal processes. Where public infrastructure is on land or under the ownership/management of DoI Crown Lands & Water, consult with DoI Crown Lands & Water as part of assessment and planning processes and in accordance with MoU (where applicable). Prior to the implementation of any actions, there may be the need to obtain authorisations under the Crown Lands <i>(est. \$60,000 grant funding) [IA9]</i></p>	<p>Develop a Coastal Natural Asset strategy focusing on bush regeneration and weed control for the continued enhancement of biodiversity in the coastal zone. <i>(MCC Natural Systems budget partial grant funding if required) [MLA10]</i></p>
	<p>Working collaboratively with residents and relevant agencies e.g. DoI Crown Lands & Water to reduce the number of informal beach accesses along the coast through dune restoration programs, aimed at revegetating with native species. Liaison with adjoining property owners in relation to the need to use formalised access points. <i>(grant funding cost est. to be confirmed) (liaise with Greater Taree Holiday and Leisure Reserves Reserve Trust) [IA10]</i></p>	

Location	Immediate Actions	Medium / Long Term Actions
Diamond Beach	Develop and implement weed management action plan with relevant land managers. With the aim to reduce weed invasion to improve native vegetation resilience. <i>(MCC Natural Systems budget) [IA11]</i>	
	Continue to enhance strong partnership with Hallidays Point Landcare, the DoI Crown Lands & Water, NSW National Parks & Wildlife Service and the Office of Environment and Heritage. <i>(MCC Natural Systems budget) [IA12]</i>	
	Develop and implement community education program to support above listed works <i>(grant funding cost est. to be confirmed) [IA13]</i>	
	Review CZMP and actions by 2021 <i>(grant funding cost est. to be confirmed) [IA15]</i>	

TABLE 6. MANAGEMENT ACTIONS DIAMOND BEACH

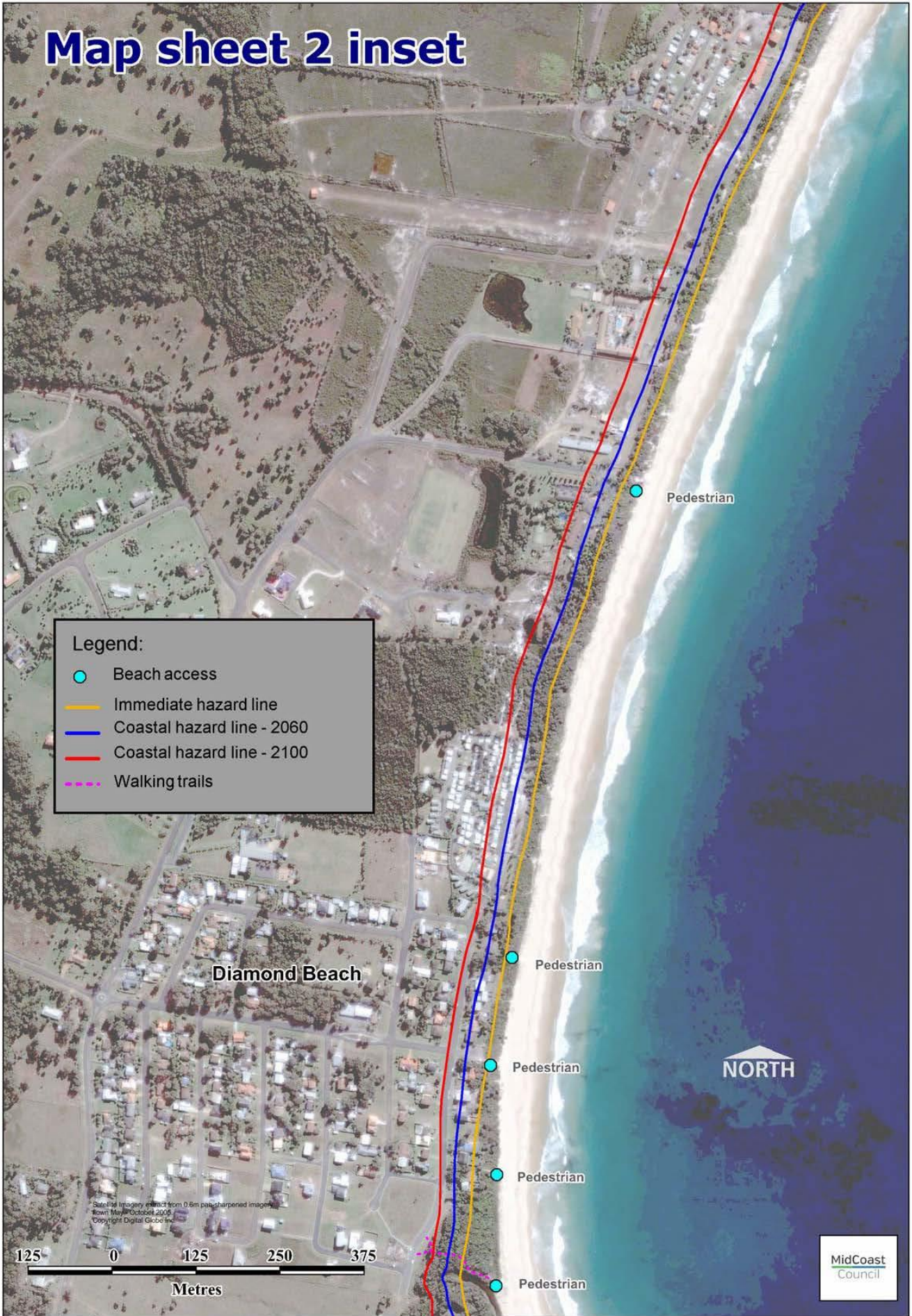
Map sheet 2

Satellite imagery updated from October 2005 to May 2006
Review May - October 2006
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MAP 7. DIAMOND BEACH

Map sheet 2 inset



MAP 8. DIAMOND BEACH INSERT

2.3 SALTWATER TO WALLABI POINT

2.3.1 ASSETS AFFECTED - SALTWATER TO WALLABI POINT

The following table lists assets that could be affected by coastal processes as identified in Map 9 below. These assets have been identified from the projected hazard lines. Development of the hazards lines is stated in section 2 above.

Location	Immediate	2060	2100
Saltwater to Wallabi Point	Stormwater outlet, southern side of Wallabi Point	Marginal impact seaward end of Marine Drive, Ocean Drive and Saltwater Road, Wallabi Point	Seaward end of Marine Drive, Ocean Drive and Saltwater Road, Wallabi Point
	Sewerage Pumping Station	Water main to rural properties	Stormwater outlet to First Rock Gully Creek entrance
		4 rural properties (eastern edge) along saltwater Road	Water main to rural properties
			4 rural properties (eastern edge) along saltwater Road
			1 property (eastern edge) corner of Seaview Pde and Saltwater Rd.
			Stormwater outlet, southern side of Wallabi Point
			Sewer and water mains along Seaview Parade

TABLE 7. ASSETS AFFECTED SALTWATER TO WALLABI

2.3.2 MANAGEMENT ACTIONS - SALTWATER TO WALLABI POINT

It is understood that a combination of management actions are required when coping with the challenges of coastal processes.

The following table outlines actions that MidCoast Council will undertake in the Saltwater to Wallabi Point area. *(Where indicated, Council will work with identified agency in relation to action). (Where indicated, identified actions will have funding sourced from identified Council budgets. Where indicated "grant funding" refers to funding being applied from an external grant funding source. No specific funding source has been identified as not to restrict potential funding sources, however, the OEH Coast and Estuary grants have been identified as a main source of grant funding potential).* See Appendix 3 for alternative layout of management actions

Location	Immediate Actions	Medium / Long Term Actions
Saltwater to Wallabi Point	<p>Review Emergency Action Plan for stormwater outlet, formal beach access points, Saltwater Road and car park. Update if necessary. Where public infrastructure is on land or under the ownership/management of DoI Crown Lands & Water, consult with DoI Crown Lands & Water as part of assessment and planning processes and in accordance with MoU (where applicable). Prior to the implementation of any actions, there may be the need to obtain authorisations under the Crown Lands <i>(est. \$15,000 grant funding)</i> [IA21]</p>	<p>Review data gathered from available science to ensure, including the beach monitoring data, CZMP / CMP actions are up to date and relevant. <i>((MCC Natural Systems budget partial grant funding if required)</i> [MLA1]</p>
	<p>Review management plans for foreshore reserves and stormwater outlets. <i>(MCC Transport Assets Budget)</i> <i>(may require input from DoI Crown Lands & Water)</i> [IA18]</p>	<p>Develop management plan for Saltwater Road and carpark. Plan to outline actions for the short term retention and ultimate removal of road Additional investigation to consider relocation of the road to the west (through private property and/or National Park). <i>(MCC Natural Systems and Projects & Engineering budget partial grant funding if required)</i> [MLA15]</p>
	<p>Review potential stormwater impacts on roads within identified area, include in management plans if haven't been previously recorded. <i>(MCC Transport Assets Budget)</i> [IA19]</p>	<p>Continue to review and update MidCoast Council LEP & DCP in relation to Coastal Risk Planning and management. Review to consider and align with any changes or amendments to State Environmental Planning Policy Coastal Management and the Coastal Management Act 2016. <i>(MCC Strategic Planning Budget)</i> [MLA3]</p>
	<p>Review future management of water mains and sewerage pumping station in Wallabi Point <i>(MCC Water Services budget)</i> [IA20]</p>	<p>Continue to implement management options towards retention, replacement or removal of public infrastructure, as per findings from internal assessment of assets in hazard zones. <i>(MCC Community Spaces budget partial grant funding if required)</i> [MLA5]</p>

Location	Immediate Actions	Medium / Long Term Actions
Saltwater to Wallabi Point	<p>Engage a contractor to develop and implement beach condition monitoring program. To focus on sand volume changes, potential wave run up impacts. Aim to improve data for future revision of coastal hazards studies and trigger points for Emergency Action Plans. <i>(est. \$45 - 60,000 grant funding)</i> [IA7]</p>	<p>Review and update specific Emergency Action Plans, if necessary. <i>(est. \$15,000 grant funding)</i> [MLA6]</p>
	<p>Commence review and implementation of MidCoast Council LEP and DCP in relation to coastal risk planning and management. Review to consider and align with State Environmental Planning Policy - Coastal Management and the <i>Coastal Management Act 2016</i>. <i>(MCC Strategic Planning budget)</i> [IA8]</p>	<p>Review management of water mains and sewerage pumping station in identified area. <i>(MCC Water Services budget)</i> [MLA14]</p>
	<p>Develop assessment of replacement or upgrade to public infrastructure in the study area. Assessment to determine requirements for construction of new or replacement of existing structures with appropriate materials. Consideration to be given to the requirement for removal of structures due to impact of coastal processes. Where public infrastructure is on land or under the ownership/management of DoI Crown Lands & Water, consult with DoI Crown Lands & Water as part of assessment and planning processes. Prior to the implementation of any actions, there may be the need to obtain authorisations under the Crown Lands <i>(est. \$60,000 grant funding)</i> [IA9]</p>	<p>Develop a Coastal Natural Asset Strategy focusing on bush regeneration and weed control for the continued enhancement of biodiversity in the coastal zone. <i>(MCC Natural Systems budget partial grant funding if required)</i> [MLA10]</p>
	<p>Working collaboratively with residents and relevant agencies e.g. DoI Crown Lands & Water to reduce the number of informal beach accesses along the coast through dune restoration programs, aimed at revegetating with native species. Liaison with adjoining property owners in relation to the need to use formalised access points. <i>(grant funding cost est. to be confirmed)</i> <i>(liaise with Greater Taree Holiday and Leisure Reserves Reserve Trust)</i> [IA10]</p>	
	<p>Develop and implement weed management action plan with relevant land managers. With the aim to reduce weed invasion to improve native vegetation resilience. <i>(MCC Natural Systems budget)</i> [IA11]</p>	

Location	Immediate Actions	Medium / Long Term Actions
Saltwater to Wallabi Point	<p>Continue to enhance strong partnership with the DoI Crown Lands & Water, NSW National Parks & Wildlife Service and the Office of Environment and Heritage. <i>(MCC Natural Systems budget) [IA12]</i></p> <p>Develop and implement community education program to support above listed works. <i>(grant funding cost est. to be confirmed) [IA13]</i></p> <p>Review CZMP and actions by 2021. <i>(grant funding cost est. to be confirmed) [IA15]</i></p>	

TABLE 8. MANAGEMENT ACTIONS - SALTWATER TO WALLABI POINT

2.4 HARRINGTON ENTRANCE TO CROWDY HEAD

2.4.1 ASSETS AFFECTED - HARRINGTON ENTRANCE TO CROWDY HEAD

The following table lists assets that could be affected by coastal processes as identified in Maps 10, 11, 12 & 13 below. These assets have been identified from the projected hazard lines. Development of the hazards lines is stated in section 2 above.

Location	Immediate	2060	2100
Harrington Entrance to Crowdy Head	Sediment loss from beach	Some areas subject to over wash from wave run up under a 0.5m sea level rise coupled with a 1 in 100 year ARI storm event.	Some areas subject to over wash from wave run up under a 0.9m sea level rise coupled with a 1 in 100 year ARI storm event.
	Harrington Breakwall	Harrington Breakwall	Harrington Breakwall
	No development, facilities or infrastructure at risk		
	Review beach access opportunities		

TABLE 9. ASSETS AFFECTED HARRINGTON ENTRANCE TO CROWDY HEAD

2.4.2 MANAGEMENT ACTIONS - HARRINGTON ENTRANCE TO CROWDY HEAD

It is understood that a combination of management actions are required when coping with the challenges of coastal processes. The following table outlines actions that MidCoast Council will undertake in the Harrington to Crowdy Head area. *(Where indicated, Council will work with identified agency in relation to action). (Where indicated, identified actions will have funding sourced from identified Council budgets. Where indicated "grant funding" refers to funding being applied from an external grant funding source. No specific funding source has been identified as not to restrict potential funding sources, however, the OEH Coast and Estuary grants have been identified as a main source of grant funding potential).* See Appendix 3 for alternative layout of management actions

Location	Immediate Actions	Medium / Long term Actions
<p>Harrington Beach, Harrington Inlet, to Crowdy Head and Crowdy Harbour</p>	<p>Review Emergency Action Plan for public access points and walking trails update as necessary. Where public infrastructure is on land or under the ownership/management of DoI Crown Lands & Water, consult with DoI Crown Lands & Water as part of assessment and planning processes and in accordance with MoU (where applicable). Prior to the implementation of any actions, there may be the need to obtain authorisations under the Crown Lands. <i>(est. \$15,000 grant funding) [IA22]</i></p>	<p>Review data gathered from available science, including the beach monitoring data, to ensure CZMP / CMP actions are up to date and relevant. <i>(MCC Natural Systems budget partial grant funding if required) [MLA1]</i></p>
	<p>Review management plans for foreshore reserves, public recreational points and stormwater outlets, update as necessary. <i>(MCC Transport Assets Budget) (may require input from DoI Crown Lands & Water) [IA18]</i></p>	<p>Continue to review and update MidCoast Council LEP and DCP in relation to coastal risk planning and management. Review to consider and align with any changes or amendments to State Environmental Planning Policy Coastal Management and the Coastal Management Act 2016. <i>(MCC Strategic Planning Budget) [MLA3]</i></p>
	<p>Review potential stormwater impacts on roads within identified area, include in management plans if haven't been previously recorded. <i>(MCC Transport Assets Budget) [IA19]</i></p>	<p>Continue to implement management options towards retention, replacement or removal of public infrastructure, as per findings from internal assessment of assets in hazard zones <i>(MCC Community Spaces budget partial grant funding if required) [MLA5]</i></p>

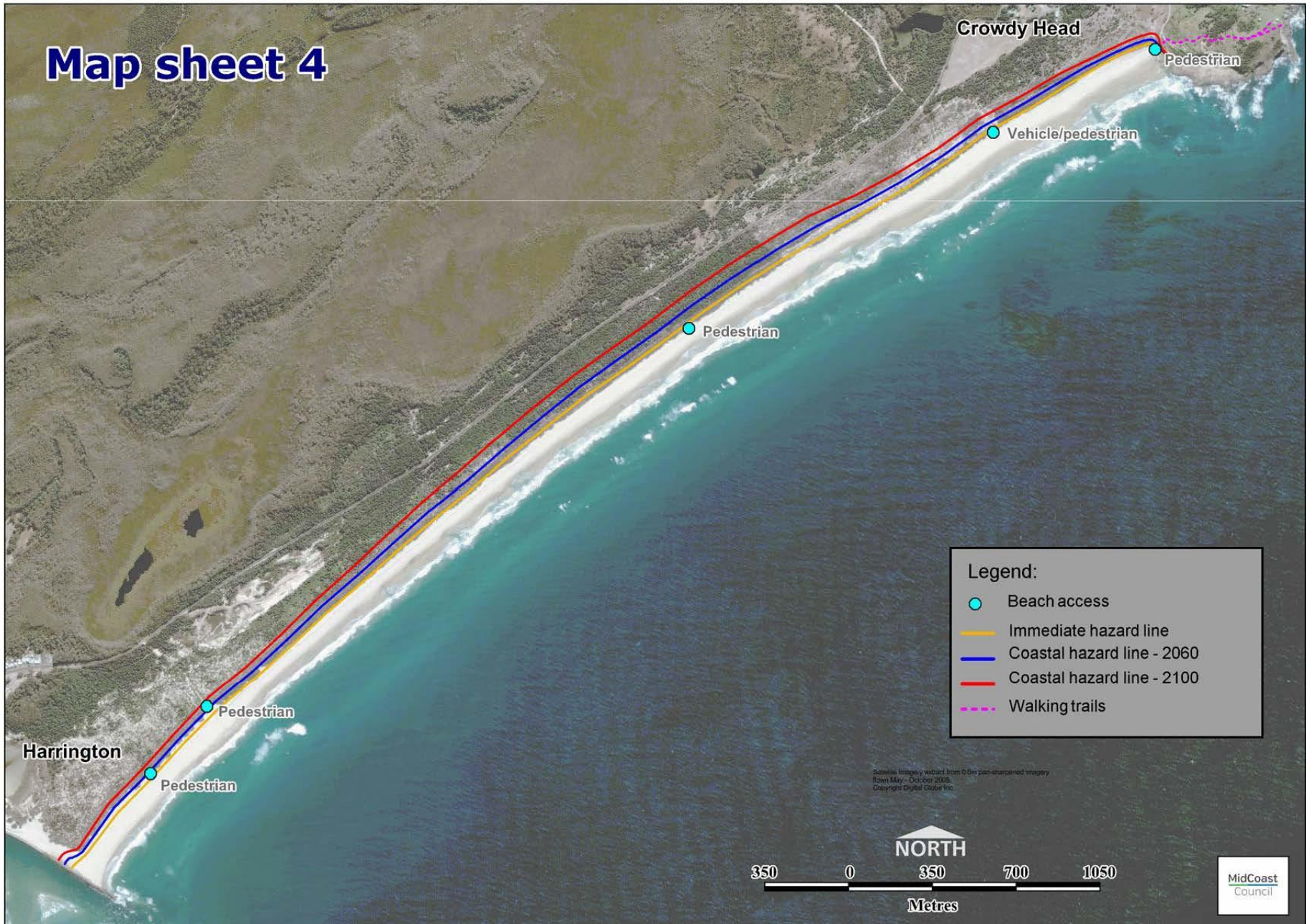
Location	Immediate Actions	Medium / Long term Actions
<p>Harrington Beach, Harrington Inlet, to Crowdy Head and Crowdy Harbour</p>	<p>Engage a contractor to develop and implement beach condition monitoring program. To focus on sand volume changes, potential wave run up impacts. Aim to improve data for future revision of coastal hazards studies and trigger points for Emergency Action Plans. <i>(est. \$45 - 60,000 grant funding)</i> [IA7]</p>	<p>Review and update specific Emergency Action Plans for public access points, including boat ramps, walking trails and formal beach access points. Where public infrastructure is on land or under the ownership/management of DoI Crown Lands & Water, consult with DoI Crown Lands & Water as part of assessment and planning processes and in accordance with MoU (where applicable). Prior to the implementation of any actions, there may be the need to obtain authorisations under the Crown Lands. <i>(est. \$15,000 grant funding)</i> [MLA16]</p>
	<p>Commence review and implementation of MidCoast Council LEP and DCP in relation to coastal risk planning and management. Review to consider and align with State Environmental Planning Policy - Coastal Management and the <i>Coastal Management Act 2016</i>. <i>(MCC Strategic Planning budget)</i> [IA8]</p>	<p>Liaise with DoI Crown Lands & Water in relation to their break wall and training walls maintenance program in relation to the long term management of Council assets adjacent to the identified Crown Lands assets. <i>(MCC Natural Systems)</i> [MLA17]</p>
	<p>Develop assessment of replacement or upgrade to public infrastructure in the study area. Assessment to determine requirements for construction of new or replacement of existing structures with appropriate materials. Consideration to be given to the requirement for removal of structures due to impact of coastal processes. Where public infrastructure is on land or under the ownership/management of DoI Crown Lands & Water, consult with DoI Crown Lands & Water as part of assessment and planning processes and in accordance with MoU (where applicable). Prior to the implementation of any actions, there may be the need to obtain authorisations under the Crown Lands Act 1989 <i>(est. \$60,000 grant funding)</i> [IA9]</p>	<p>Develop a Coastal Natural Asset Strategy focusing on bush regeneration and weed control for the continued enhancement of biodiversity in the coastal zone. <i>(MCC Natural Systems budget partial grant funding if required)</i> [MLA10]</p>
	<p>Working collaboratively with residents and relevant agencies e.g. DoI Crown Lands & Water to reduce the number of informal beach accesses along the coast through dune restoration programs, aimed at revegetating with native species. Liaison with adjoining property owners in relation to the need to use formalised access points. <i>(grant funding cost est. to be confirmed)</i> <i>(liaise with Greater Taree Holiday and Leisure Reserves Reserve Trust)</i> [IA10]</p>	<p>Investigate approvals pathways for formalising the surf club carpark and seek funding if the works are considered feasible. Subject to the availability of funding and planning approvals, design and implement the works (design should incorporate consideration of sea level rise). Seek funding to formalise surf club carpark – plan to accommodate sea level rise <i>(est. \$400,000 grant funding)</i> <i>(Harrington Beach State Park Trust)</i> [MLA18]</p>

Location	Immediate Actions	Medium / Long term Actions
<p>Harrington Beach, Harrington Inlet, to Crowdy Head and Crowdy Harbour</p>	<p>Develop and implement weed management action plan with relevant land managers. With the aim to reduce weed invasion to improve native vegetation resilience. <i>(MCC Natural Systems budget) [IA11]</i></p>	<p>Liaise with DoI Crown Lands & Water, Harrington Beach State Park Trust, user groups and other key stakeholders in relation to future plans for Crowdy Bay Harbour and the public assets contained within. <i>(MCC Natural Systems budget). [MLA19]</i></p>
	<p>Continue to enhance strong partnership with the Manning Entrance State Park Trust representative organisations. <i>(MCC Natural Systems budget) [IA12]</i></p>	<p>Through the Harrington Beach State Park Trust, consult with the community and stakeholders concerning future plans for the area around the lighthouse, including construction of a whale watching platform <i>(MCC Community Spaces budget and grant funding \$20,000) [MLA20]</i></p>
	<p>Develop and implement community education program to support above listed works. <i>(grant funding cost est. to be confirmed) [IA13]</i></p>	
	<p>Construction of an off-road shared pathway of 3m wide and 6km long between Harrington Big 4 Caravan Park to Crowdy Head Harbour <i>(est. \$2.3m S94 and grant funding [this item is included in the Greater Taree S94 Contributions Plan 2016 - Greater Taree Works Schedule – GT4]).</i> In addition, consents and authorisations may be required under other legislation, including <i>Native Title Act 1993 (Cth)</i> and <i>Aboriginal Land Rights Act 1983 (NSW)</i>. <i>[IA23]</i></p>	
	<p>Review and implement maintenance dredging program within the Harrington Inlet, main channel, Harrington Waters Marina (incl boat ramp area), Harrington Lagoon, Harrington Backchannel and Crowdy Bay Harbour in accordance with the <i>Manning River Maintenance Dredging Strategy 2010</i>. Liaise with relevant public authorities as required. <i>(grant funding cost est. to be confirmed). [IA24]</i></p>	
	<p>Liaise with the DoI Crown Lands & Water in relation to the maintenance program for the Harrington and Crowdy Bay Harbour breakwalls and training walls in relation to the long term management of Council assets adjacent to the identified Crown Lands assets. <i>(MCC Natural Systems budget) [IA25]</i></p>	

Location	Immediate Actions	Medium / Long term Actions
<p>Harrington Beach, Harrington Inlet, to Crowdy Head and Crowdy Harbour</p>	<p>Review existing Manning Entrance and Harrington Beach State Parks Memorandum of Understanding (2012) between NSW Trade & Investment - Crown Lands and the Greater Taree City Council. Mou for these State parks to be under joint Management between DoI Crown Lands & Water and MCC. Responsibilities for actions and overall strategic approach to managing the coastal zone should be consistent with this CZMP. <i>(MCC Natural Systems budget) (DoI Crown Lands & Water) [IA26]</i></p> <p>Review CZMP and actions by 2021. <i>(grant funding cost est. to be confirmed) [IA15]</i></p>	

TABLE 10. MANAGEMENT ACTIONS HARRINGTON ENTRANCE TO CROWDY HEAD

Map sheet 4



MAP 10. HARRINGTON TO CROWDY HEAD.

Map sheet 4A



MAP 11. HARRINGTON

Map sheet 5

Satellite imagery extracted from 0.6m pan-sharpened imagery
from May - October 2005.
Copyright Digital Globe Inc.

Diamond Head

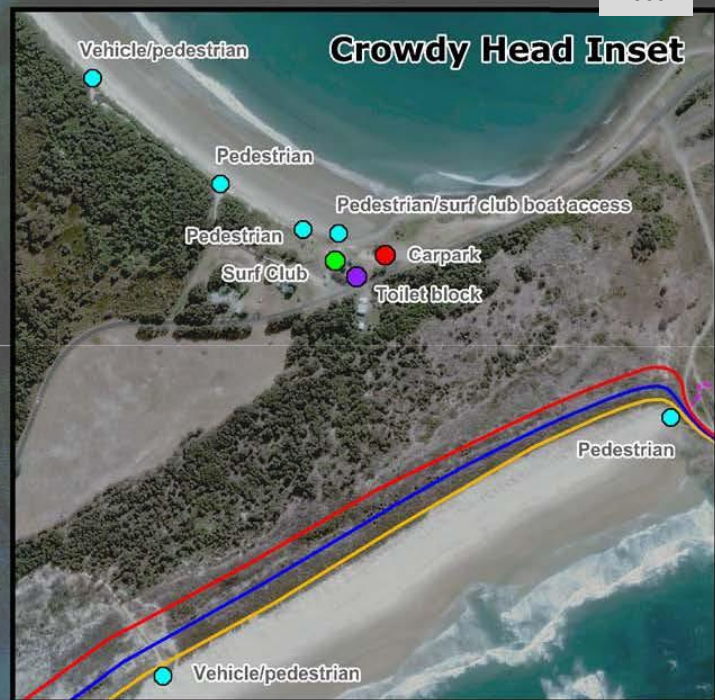


Vehicle/pedestrian

Legend:

- Beach access
- Carpark
- Surf Club
- Toilet block
- Immediate hazard line
- Coastal hazard line - 2060
- Coastal hazard line - 2100
- Walking trails

2060



Crowdy Head (see inset)



MidCoast Council

MAP 12. CROWDY TO DIAMOND HEAD

Map sheet 5A

NORTH

Legend:

- Beach access
- Carpark
- Boat ramp
- Trailer parking area
- Toilet block
- Surf Club
- Whale watching platform
- Immediate hazard line
- Coastal hazard line - 2060
- Coastal hazard line - 2100
- Walking trails



MAP 13. CROWDY HEAD AND CROWDY BAY HARBOUR

3. APPENDICES

APPENDIX 1 - CZMP PLANNING REQUIREMENTS

Demonstration of how this CZMP has complied with the Guidelines for Preparing Coastal Zone Management Plan July 2013, under section 55D of the *Coastal Protection Act 1979*.

CZMP Requirement Planning Process Content

	Coastal Management Principle	How the CZMP meets Principles
<p>How the relevant Coastal Management Principles have been considered in preparing the plan</p>	<p>Consider the objectives of the <i>Coastal Protection Act 1979</i> and the goals, objectives and principles of the NSW Coastal Policy 1997.</p> <p>Optimise links between plans relating to the management of the coastal zone.</p>	<p>The CZMP has considered the goals and objectives of identified Acts and Policy's. Examples of which are spread across the document.</p> <p>This CZMP has linked the findings from the following technical documents to the management of the coastal zone.</p> <p>Coastal Hazard Definition Study (2010)</p> <ul style="list-style-type: none"> • Coastal Hazard Definition Study (2010) • Coastline Management Study (2010) • Greater Taree Coast Emergency Action Plan (2011) • Coastal Zone Management Plan (2013) • Coastal Zone Management Plan - GTCC Introduction (2014) • Greater Taree Coastal Zone Management Plan (September 2015) [Rescinded by this report, as per Part 4A Division 1 Section 55I (1&2) of the Coastal Protection Act 1979]. <p>See section 1.3.1 for more information.</p>
	<p>Involve the community in decision-making and make coastal information publicly available.</p>	<p>Members of the community have been invited to contribute to the development of this plan through several public exhibition periods and community briefing sessions. These opportunities for contribution were advertised via media releases, paid advertisements, flyers, posters and direct emails.</p> <p>In addition to these methods, over 5,700 letters were sent to landowners to advise of the exhibition of the document and opportunities to meet with staff and lodge a submission.</p>

CZMP Requirement Planning Process Content (cont.)

Coastal Management Principle	How the CZMP meets Principles
<p>Involve the community in decision-making and make coastal information publicly available. (cont.)</p>	<p>Council staff spoke with approximately 150 people attended the drop-in centres during the exhibition period held at the following venues and times:</p> <ul style="list-style-type: none"> • Harrington Multi-purpose Centre <ul style="list-style-type: none"> ○ Tuesday 30 May 2017 – 10am to 2pm • Old Bar Surf Life Saving Club <ul style="list-style-type: none"> ○ Wednesday 31 May 2017 – 10am to 1pm ○ Tuesday 6 June 2017 – 4pm to 6pm • Black Head Surf Life Saving Club <ul style="list-style-type: none"> ○ Thursday 1 June 2017 – 10am to 1pm ○ Wednesday 7 June 2017 – 4pm-6pm <p>Further information relating to community involvement can be found on Council's website www.midcoast.nsw.gov.au See section 1.3.10 for more information</p>
<p>Base decisions on the best available information and reasonable practice; acknowledge the interrelationships between catchment, estuarine and coastal processes; adopt a continuous improvement management approach.</p>	<p>This CZMP is based upon the best available science, and is set to be reviewed regularly to ensure the plan stays up to date with revised science. See sections 1.3.2, 1.3.3 and 2 for more information.</p>
<p>The priority for public expenditure is public benefit; public expenditure should cost-effectively achieve the best practical long-term outcomes.</p>	<p>An action plan for each beach compartment has been created as part of this CZMP. Actions have been detailed with responsibilities of implementation and the timeframe to implement. See section 2 for more information.</p>
<p>Adopt a risk management approach to managing risks to public safety and assets; adopt a risk management hierarchy involving avoiding risks where feasible and mitigation where risks cannot be reasonably avoided; adopt interim actions to manage high risks while long-term options are implemented.</p>	<p>The GTCC Coast Emergency Action Plan 2011 manages risks to public safety during and after storm events. This CZMP outlines the risks associated with our changing coastline to public safety and assets. In addition to the actions identified, this CZMP calls for additional Emergency Action Plans to be created for specific locations to provide for continued public access. See sections 1.3.4, 1.3.5, 1.3.6 and 2 for more information.</p>

CZMP Requirement Planning Process Content (cont.)

Coastal Management Principle	How the CZMP meets Principles
Adopt an adaptive risk management approach if risks are expected to increase over time, or to accommodate uncertainty in risk projections.	The CZMP uses a risk management approach by firstly identifying the areas likely to be affected by coastal recession now and into the future. The plan specifies actions that will be taken in regard to existing development and the implementation of controls to manage the risk to future development. See sections 1.3.3, 1.3.4 and 1.3.5 for more information.
Maintain the condition of high value coastal ecosystems; rehabilitate priority degraded coastal ecosystems.	The CZMP includes actions for all beach compartments to undertake weed control and vegetation enhancement which will lead to the restoration and protection of important coastal ecosystems. See sections 1.3.9 and 2 for more information.
Maintain and improve safe public access to beaches and headlands consistent with the goals of the NSW Coastal Policy.	The action plans for each beach in this CZMP include actions to rationalise the number of beach accesses to improve degraded coastal ecosystems whilst at the same time improving accesses that are intended to be retained. Improvement to walking trails is also proposed for headlands, as well as additional viewing platforms which will provide for an improved visitor experience See section 1.3.7 for more information.
Support recreational activities consistent with the goals of the NSW Coastal Policy.	The action plans within this CZMP include measures to improve beach access and walking trails which will support public use of these areas. See section 2 for more information

How the CZMP met the requirements

- Over an eight year period, feedback to various stages of the CZMP has been received. The objectives detailed in Section 1.2, above, are in direct response to feedback received from the community and provide the fundamental principles that underpin this CZMP.
- As a part of this process all associated documents were placed on public exhibition in accordance with the *Coastal Protection Act 1979* and displayed for a period of no less than 21 days. The public exhibition period was held over 29 days from Friday 26 May to Friday 23 June 2017. In addition to the above, members of the community were invited to contribute to the development of this plan through several public exhibition periods and community briefing sessions. These opportunities for contribution were advertised via media releases, paid advertisements, flyers and posters. In addition to these methods, over 5,700 letters were sent to landowners to advise of the exhibition of the document and opportunities to meet with staff and lodge a submission.
- **See section 1.3.10** for more information

The community and stakeholder consultation process, the key issues raised and how they have been considered

- A Coastline Management Study (WorleyParsons 2010) was commissioned to identify long-term management options for Diamond Beach (south). No other beaches covered by this CZMP had major management options identified.
- Low cost management actions were identified which contribute to maintaining public access to beaches while improving and conserving important environmental attributes. These actions stem from the public consultation which informed the objectives of this CZMP
- **See sections 1.3.1, 1.3.3 and 1.3.4** for more information.

How the proposed management options were identified, the process followed to evaluate management options, and the outcomes of the process

- All actions from the tables in **Section 2** of this CZMP are proposed to be undertaken by Council, subject to grant funding.
- Collaboration/partnerships between Council and/or government agencies and community groups are encouraged under this plan to implement management actions (see **section 1.3.10**); and
- Private land owner actions are guided by coastal management sections of the Greater Taree Development Control Plan (DCP) 2010 (as amended). Refer to the MidCoast Council website for the DCP and more information on planning controls. **See Section 2** for more information.

Proposed management actions over the CZMP's implementation period in a prioritised implementation schedule which contains:-
• **proposed funding arrangements for all actions, including any private sector funding;**

- Actions arising from this CZMP are the responsibility of the local Council. Where relevant interactions with State agencies will be undertaken. As such the actions to be implemented are the sole responsibility of the local authority.
- Actions arising from this CZMP are the responsibility of the local Council. Where relevant interactions with State agencies will be undertaken. As such the actions to be implemented are the sole responsibility of the local authority.
- **See section 2** for more information.

• **actions to be carried out by a public authority or relating to land or other assets it owns or manages, where the authority has agreed to these actions (section 55C(2) (b) of the Coastal Protection Act 1979)**

CZMP Requirement Planning Process Content (continued)

How the CZMP met the requirements

• proposed actions to monitor and report to the community on the plan's implementation, and a review timetable.

- The actions identified in the Action Plan will be included in Council's Delivery Program and Operational Plans and hence will be monitored and reported on through Council's Integrated Planning and Reporting (IP&R) framework; and
- This CZMP includes the triggers to review the CZMP if these are reached, otherwise the CZMP will be reviewed and integrated into a Coastal Management Program under the *Coastal Management Act 2016* by 2021
- **See sections 1.3.5 and 2** for more information

CZMPs are to be prepared are using a process that includes:

Evaluating potential management options by considering social, economic and environmental factors, to identify realistic and affordable actions

- All management options within this CZMP have considered social, economic and environmental factors. These considerations have allowed for cost effective and practical actions to be developed
- **See section 2** for more information

Consulting with the local community and other relevant stakeholders. The minimum consultation requirement is to publicly exhibit a draft plan for not less than 21 days, with notice of the exhibition arrangements included in a local paper (section 55E of the *Coastal Protection Act 1979*).

- During the eight year period in the lead up to this CZMP all documents placed on public exhibition were done so in accordance with the Local Government Act and displayed for a period of no less than 21 days. All public exhibitions events were advertised in local papers, as per the legislative requirement.
- The public exhibition period was held over 29 days from Friday 26 May to Friday 23 June 2017. In addition to the above, members of the community were invited to contribute to the development of this plan through several public exhibition periods and community briefing sessions. These opportunities for contribution were advertised via media releases, paid advertisements, flyers and posters. In addition to these methods, over 5,700 letters were sent to landowners to advise of the exhibition of the document and opportunities to meet with staff and lodge a submission.
- **See section 1.3.10** for more information

CZMPs are to achieve a reasonable balance between any potentially conflicting uses of the coastal zone

- This CZMP has considered potential conflicts of use within the coastal zone. These considerations have allowed for cost effective and practical actions to be developed.
- **See section 1.3.5, 1.3.7 and 2** for more information

CZMP Requirement Coastal Risks

A description of:

- coastal processes within the plan's area, to a level of detail sufficient to inform decision-making

- the nature and extent of risks to public safety and built assets from coastal hazards

- projected climate change impacts on risks from coastal hazards (section 55C(f) of the Coastal Protection Act 1979), based on council's adopted sea level rise projections or range of projections. Councils should consider adopting projections that are widely accepted by competent scientific opinion

- suitable locations where landowners could construct coastal protection works (provided they pay for the maintenance of the works and manage any offsite impacts), subject to the requirements of the Environmental Planning and Assessment Act 1979

- property risk and response categories for all properties located in coastal hazard areas

How the CZMP met the requirements

- The Coastal Hazard Definition Study (WorleyParsons 2010) provides a detailed explanation of the coastal processes that have informed the preparation of this CZMP.
- See **sections 1.3.3 and 2** for more information
- Public safety risks are identified and have been considered in relation to management options. Further, the Coastal Hazard Definition Study (WorleyParsons 2010) shows the immediate hazard line, 2060 hazard line and 2100 hazard line and identifies the built assets within this areas of risk (these areas are reproduced in this CZMP). Finally, the GTCC Coast Emergency Action Plan 2011 details how risks will be managed during and after storm events.
- **See sections 1.3.1, 1.3.3 and 1.3.4** for more information.
- The sea level rise figures used to support this CZMP were originally based on the figures produced by the CSIRO, which were used as the basis for the State Government's Sea Level Rise Policy Statement 2009 (no longer supported by the State). These were a predicted increase above 1990 mean sea levels of 40cm by the year 2050 and a rise of 90cm by the year 2100.
- **See section 1.3.2** for more information.
- Due to the nature of the beaches covered by this CZMP, this plan has had no need to identify locations where landowners could construct coastal protection works. This situation will be reviewed when this CZMP is converted into a CMP (by 2021) if erosion is experienced
- **See section 1.3.4** for more information.
- The Coastal Hazard Definition Study (WorleyParsons 2010) identifies the risks posed along the coast which are transferred into the immediate hazard line/foreshore building line, 2060 erosion line and 2100 erosion line as shown within this CZMP. While the immediate hazard line/foreshore building line is based upon a possible severe storm cut, the 2060 and 2100 erosion lines are based upon sea level rise projections and the impact this may have on coastal erosion. There is currently a low risk to properties covered by this plan though this is anticipated to increase over time as the impacts of sea level rise becomes more noticeable. This plan details the need to observe this impact and revise the plan accordingly over time.
- **See section 1.3.4 and Appendix 2** for more information.

CZMP Requirement Coastal Risks (continued)

How the CZMP met the requirements

Proposed actions in the implementation schedule to manage current and projected future risks from coastal hazards, including risks in an estuary from coastal hazards. Actions are to focus on managing the highest risks (section 55C(d) and (e) of the *Coastal Protection Act 1979*)

- For the Manning River this is addressed in the:
 - Manning River Estuary Processes Study 1997
 - Manning River Estuary Management Study 2009
 - Manning River Estuary Management Plan 2009
 - Manning River Estuary Management Plan Implementation Schedule – 2014 Update.
- For our beaches this is addressed in this CZMP, with the proposed actions to address current and future risks outlined throughout.
- **See section 1.3.1** and **1.3.4** for more information.

Where the plan proposes the construction of coastal protection works (other than temporary coastal protection works) that are to be funded by the council or a private landowner or both, the proposed arrangements for the adequate maintenance of the works and for managing associated impacts of such works (section 55C(g) of the *Coastal Protection Act 1979*)

- This CZMP does not propose the construction of new coastal protection works
- Where maintenance works on existing locations to provide continued resilience has been identified, management options call for investigation and redesign studies to be commissioned. (Black Head SLSC, Crowdy Head Harbour, Harrington northern breakwall, training wall and spur wall).
- **See sections 1.3.4** and **2** for more information.

An emergency action subplan, which is to describe:

- *intended emergency actions to be carried out during periods of beach erosion such as coastal protection works for property or asset protection, other than matters dealt with in any plan made under the State Emergency and Rescue Management Act 1989 relating to emergency response (sections 55C(b) and (g) of the Coastal Protection Act 1979)*
- *any site-specific requirements for landowner temporary coastal protection works; and*
- *the consultation carried out with the owners of land affected by a subplan*

- *The Greater Taree Coast Emergency Action Plan 2011 (WorleyParsons) was Certified by the NSW Minister for the Environment, the Hon Robyn Parker MP, on 28 February 2012 and subsequently proclaimed in the NSW Government Gazette.*
 - In addition to the actions identified, this CZMP calls for additional Emergency Action Plans to be created for specific locations to provide for continued public access.
 - **See sections 1.3.6** and **2** for more information.
-

CZMP Requirement Coastal Ecosystems

A description of:

- the health status of estuaries within the plan's area;
- the pressures affecting estuary health status and their relative magnitude; and
- projected climate change impacts on estuary health (section 55C(f) of the Coastal Protection Act 1979), based on council's adopted sea level rise projections or range of projections

Proposed actions in the implementation schedule to respond to estuary health pressures (section 55C(e) of the Coastal Protection Act 1979)

An entrance management policy for intermittently closed and open lakes and lagoons (ICOLLs)

An estuarine monitoring program, consistent with the NSW Natural Resources Monitoring, Evaluation and Reporting (MER) Strategy.

How the CZMP met the requirements

- This is addressed in the:
 - Manning River Estuary Processes Study;
 - Manning River Estuary Management Study;
 - Manning River Estuary Management Plan; and
 - Manning River Estuary Management Plan Implementation Schedule – 2014 Update.
 - **See section 1.3.9** for more information.
 - See the Manning River Estuary Management Plan Implementation Schedule – 2014 Update
 - **See section 1.3.9** for more information
 - This is addressed in the Black Head Lagoon Entrance Plan of Management 2008 (GTCC)
 - **See section 1.3.9** for more information.
 - Council has partnered with the NSW Office of Environment & Heritage to undertake water quality monitoring throughout each year (commenced in 2013) to produce a report card grade for the health of Manning Estuary.
 - **See section 1.3.9** for more information
-

CZMP Requirement Community Uses of the Coastal Zone

How the CZMP met the requirements

CZMPs are to contain

- Proposed actions in the implementation schedule that protect and preserve beach environments and beach amenity, and ensure continuing and undiminished public access to beaches, headlands and waterways, particularly where public access is threatened or affected by accretion (section 55C(c) of the *Coastal Protection Act 1979*)

- Action plans have recommended to be created for beaches within this this CZMP. Management options timeframes for implementation are to be included. These action plans are centred on continuing to improve public access to beaches and to provide additional facilities at these locations.
- All foreshore areas covered by the plan are in public ownership
- **See section 1.3.7 and 2** for more information.

A description of

- the current access arrangements to beaches, headlands and waterways in the plan's area, their adequacy and any associated environmental impacts

- The action plans for each beach shows a clear intention of Council to work collaboratively to reduce the number of unlawful beach accesses to reduce environmental degradation and increase vegetation connectivity. At the same time Council intends to improve remaining accesses and undertake community education
- **See sections 1.3.7 and 2** for more information

- any potential impacts (e.g. erosion, accretion or inundation) on these access arrangements

- The potential impacts occur occasionally after storm events. As this depends on the storm direction and intensity it is difficult to predict which beach accesses may be affected. As such the CZMP takes the approach of nominating to maintain/improve all formal beach accesses
- **See section 1.3.6** for more information.

- the cultural and heritage significance of the plan's area.

- Cultural heritage significance has been addressed in this CZMP
- **See section 1.3.8** for more information

CZMP Requirement **Community Uses of the Coastal Zone** (continued)

Proposed actions in the implementation schedule to manage any environmental or safety impacts from current access arrangements, and to protect or promote the culture and heritage environment

How the CZMP met the requirements

- Action plans for each beach outline environmental and safety impacts of beach accesses, namely improving beach accesses intended to be retained and closing accesses which have an adverse environmental or safety impact.
 - European heritage is protected by identification in heritage studies (see Council's website www.midcoast.nsw.gov.au) and subsequent listing as a heritage item in the Greater Taree Local Environmental Plan 2010. Council has produced a number of brochures which can be used to undertake self-guided heritage walks in the Local Government Area which are available on our website. A number of heritage signs have been established along the river and coastline to promote better understanding of heritage.
 - Aboriginal cultural heritage is protected by identification of items and places on a database managed by the NSW Office of Environment & Heritage. Due to cultural sensitivity promotion of cultural areas is left to the Aboriginal community with the exception of Saltwater National Park which is jointly managed by the local Aboriginal community and the NSW National Parks & Wildlife Service, as well as where partnerships have been established to promote cultural heritage for specific sites, such as Cattai Wetlands where we are currently working with the Aboriginal community on cultural signage.
 - **See section 1.3.8** for more information.
-

1. A CZMPs must make provision for:

- **(a) Protecting and preserving beach environments and beach amenity**

- As a key focus, Council will work collaboratively with residents and the NSW Department of Industry – Crown Lands & water (Dol Crown Lands & Water) to reduce the number of unlawful beach accesses along our coastline. As such, actions within this CZMP have been designed with a focus on retaining formal beach access as well as improving associated infrastructure such as carparks and viewing platforms.
- **See section 1.3.7** for more information

- **(b) Emergency actions carried out during periods of beach erosion including the carrying out of related works, such as works for the protection of property affected or likely to be affected by beach erosion, where beach erosion occurs through storm activity or an extreme or irregular event**

- Actions arising from this CZMP are the responsibility of the local Council. Where relevant interactions with State agencies will be undertaken. As such the actions to be implemented are the sole responsibility of the local authority.
- *The Greater Taree Coast Emergency Action Plan 2011 (WorleyParsons) was Certified by the NSW Minister for the Environment, the Hon Robyn Parker MP, on 28 February 2012 and subsequently proclaimed in the NSW Government Gazette.*
- In addition to the actions identified, this CZMP calls for additional Emergency Action Plans to be created for specific locations to provide for continued public access.
- **See section 1.3.6 and 2** for more information

- **(c) Ensuring continuing and undiminished public access to beaches, headlands and waterways, particular where public access is threatened or affected by accretion**

- Action plans have recommended to be created for beaches within this this CZMP. Management options timeframes for implementation are to be included. These action plans are centred on continuing to improve public access to beaches and to provide additional facilities at these locations.
- All foreshore areas covered by the plan are in public ownership
- **See section 1.3.6 and 2** for more information.

- **(d) Where the plan relates to part of the coastline, the management of risks arising from coastal hazards.**

- For the Manning River this is addressed in the:
 - Manning River Estuary Processes Study 1997
 - Manning River Estuary Management Study 2009
 - Manning River Estuary Management Plan 2009
 - Manning River Estuary Management Plan Implementation Schedule – 2014 Update.
- For our beaches this is addressed in this CZMP, with the proposed actions to address current and future risks outlined throughout.
- **See section 1.3.1 and 1.3.9** for more information.

- (e) Where the plan relates to an estuary, the management of estuary health and on estuary arising from coastal hazards

- For the Manning River this is addressed in the:
 - Manning River Estuary Processes Study 1997
 - Manning River Estuary Management Study 2009
 - Manning River Estuary Management Plan 2009
 - Manning River Estuary Management Plan Implementation Schedule – 2014 Update.
- For our beaches this is addressed in this CZMP, with the proposed actions to address current and future risks outlined throughout.
- **See section 1.3.1 and 1.3.9** for more information.

- (f) The impacts from climate change on risks arising from coastal hazards and on estuary health, as appropriate

- The sea level rise figures used to support this CZMP were originally based on the figures produced by the CSIRO, which were used as the basis for the State Government's Sea Level Rise Policy Statement 2009 (no longer supported by the State). These were a predicted increase above 1990 mean sea levels of 40cm by the year 2050 and a rise of 90cm by the year 2100.
- This is further addressed in the:
 - Manning River Estuary Processes Study;
 - Manning River Estuary Management Study;
 - Manning River Estuary Management Plan; and
 - Manning River Estuary Management Plan Implementation Schedule – 2014 Update.
- **See section 1.3.3 and 1.3.9** for more information.

- (g) Where the plan proposes the construction of coastal protection works (other than emergency coastal protection works) that are to be funded by the council or a private landowner or both, the proposed arrangements for the adequate maintenance of the works and for managing associated impacts of such works (such as changed or increased beach erosion elsewhere or a restriction of public access to beaches or headlands)

- This CZMP does not propose the construction of new coastal protection works
- Where maintenance works on existing locations to provide continued resilience has been identified, management options call for investigation and redesign studies to be commissioned. (Black Head SLSC, Crowdy Head Harbour, Harrington northern breakwall, training wall and spur wall).
- *The Greater Taree Coast Emergency Action Plan 2011 (WorleyParsons) was Certified by the NSW Minister for the Environment, the Hon Robyn Parker MP, on 28 February 2012 and subsequently proclaimed in the NSW Government Gazette.*
- In addition to the actions identified, this CZMP calls for additional Emergency Action Plans to be created for specific locations to provide for continued public access.
- **See sections 1.3.4, 1.3.6, 1.3.7 and 2** for more information

2. A CZMP must not include the following:

- (a) Matters dealt with in any plan made under the *State Emergency and Rescue Management Act 1989* in relation to the response to emergencies
 - *The Greater Taree Coast Emergency Action Plan 2011 (WorleyParsons) was Certified by the NSW Minister for the Environment, the Hon Robyn Parker MP, on 28 February 2012 and subsequently proclaimed in the NSW Government Gazette.*
 - In addition to the actions identified, this CZMP calls for additional Emergency Action Plans to be created for specific locations to provide for continued public access.
 - **See sections 1.3.4, 1.3.6, 1.3.7 and 2** for more information

APPENDIX 2 - METHODOLOGY FOR COASTAL HAZARD LINES

Methodology for Terminating Coastal Hazard Lines (Erosion/Recession) at Headlands and other Durable Features

1.0 Introduction

Calculation and plotting of coastal hazard lines along beaches is based on several, usually conservative assumptions as well as generalised models of sea level impacts. The combined uncertainty embodied within such assumptions have become a source of criticism and legal challenge, often related to the subsequent introduction of coastal planning areas based upon these lines.

A notable source of public unease is that hazard lines commonly produced by consultants are based on broad geotechnical parameters related to a beach profile of unconsolidated uniform sand. Lines produced on this basis become increasingly indefensible when they are summarily terminated well clear of rocky headlands. It is intuitive to the public that these lines should eventually converge at an exposed rock outcropping in response to shallower and firmer soil conditions. Therefore, there is a demonstrated need to define a transition from the sand-based hazard lines to these hard, terminal features.

Another driver for the termination of hazard lines is the need to construct a coastal planning area, for planning assessment purposes, around these hazards. This mapped area must capture land exhibiting a similar level of risk (probability x consequence) in order to apply management measures on an equitable basis. If hazard lines are terminated prematurely, the basis for planning controls in the resulting gap is unclear.

This appendix describes the approach taken to provide endpoints to hazard lines derived as part of the Black Head to Crowdy Head: Coastal Hazard Definition Study (Worley Parsons, 2010). It is an empirical approach based on detailed site inspection recognising rock outcrops and interpolating other evidence on subgrade depth to weathered rock. It is subsequently intended to refine the interpretation of end point conditions through compiling available borehole data (e.g. Public Works Dept. of NSW, c. 1980), rutile exploratory logs and subsequent deployment of geophysical techniques such as Ground Penetrating Radar (GPR). Revision of this endpoint definition is expected to coincide with the planned conversion to the proposed Coastal Management Program by 2021.

2.0 Basis for Hazard Definition

The source of data for this CZMP is the Black Head to Crowdy Head: Coastal Hazard Definition Study (Worley Parsons, 2010). Incorporating input from NSW Office of Environment & Heritage (OEH), the following hazard lines were adopted, providing risk combinations to be considered in planning provisions, management actions and investment decisions.

Immediate Hazard Line: is based on the occurrence of an extreme ocean storm under current sea level conditions (approximately 2010). It is an estimate of the location of the hazard line (slumped escarpment) following a 1974 type storm, often called the Sygna Storm (26 May, 1974). This yellow line is included on mapping within this CZMP and represents the eastern most point at which Council is likely to consider approval of development (except for any private coastal management works).

2060 Hazard Line: is based on an extreme storm (as above) occurring around 2060 under the added influence of long term recession and projected sea level rise to 2060. The line's position is determined by application of the Bruun rule to account for sea level rise and the Nielsen Slope Stability Model. This blue line is included in mapping within this CZMP and is being used to inform development control provision contained within the Greater Taree DCP 2010 (as amended).

2100 Hazard Line: is based on an extreme storm (as above) occurring around 2100 under the added influence of long term recession and projected sea level rise to 2100. High-range (0.9m) sea level rise projections were mapped using the Bruun Rule and Nielsen Slope Model, as above. This red line is included in the mapping within this CZMP.

3.0 Erosion / Recession Hazard for Uniform Sand Profiles

The approach deployed in the Black Head to Crowdy Head: Coastal Hazard Definition Study (Worley Parsons, 2010) was based upon:

- Beach profiles comprising uniform dense, but unconsolidated sand of typical geotechnical properties
- Historical beach behaviour in terms of recession and storm erosion from photogrammetry established basic long term recession trends to present day
- Recession trends are adjusted for sea level rise projections by the Bruun Rule to produce benchmark year recession
- Storm demand modified for beach aspect by wave transformation modelling
- The Slope Stability Model (Nielsen et al, 1992 – see below) is applied at the 'beach full' condition using estimated storm demand to define zone lines for slope adjustment and reduced foundation capacity hazards

- The hazard lines were plotted for 2008, 2058 and 2100 benchmark periods

It can be seen from **Figure 1** (below) that any departure from the assumed angle of repose ($\sim\phi$) will have an impact on the position of the line of slope adjustment and the area of reduced foundation capacity ($FOS = 1.0$). Additionally, to terminate 'sand lines' at a headland feature we would need to consider specifically, the depth to durable rock material. It is therefore possible to envisage plotting applications that take this variable geometry into account producing a converging set of hazard lines in response to increasingly shallower soils.

Initiatives have been taken to refine and automate slope stability modelling (Adamantidis, C, Nielsen, S. & McConnell, D., 2014) and to a certain extent the waterRIDE coastal stability application would seem to have commenced this. However, to date within the Midcoast coastline all consultants have appeared reticent to include, at least in the first instance, the description of hazard lines within more durable soil/rock zones.

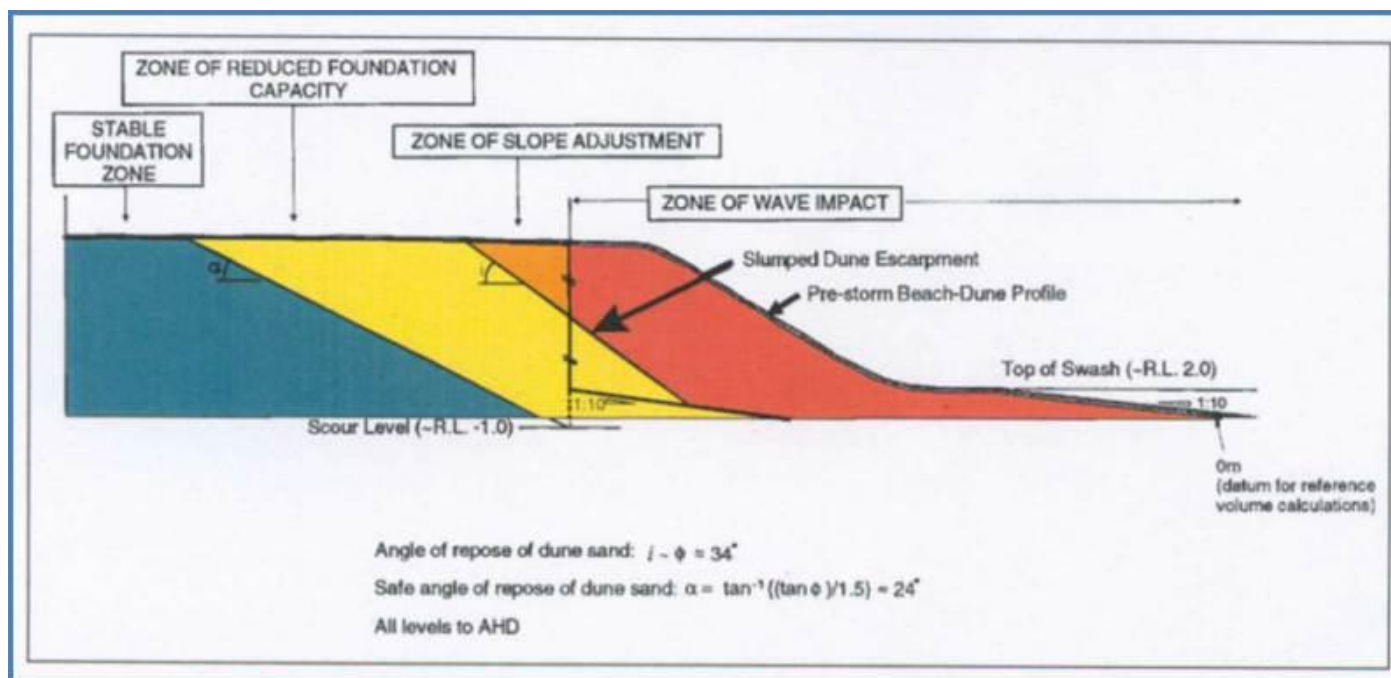


Figure 1: Slope Stability Model (after Nielsen et al, 1992)

4.0 Interpretation of Hazard Lines adjacent to Rocky Headlands

The description of hazard lines in materials other than uniform sand should be relatively easy simply by employing other data sources to comprehensively describe the depth variation through increasingly dense and durable material. These sources would include old NSW Dept. of Public Works borelogs (c. 1980's) and rutile industry prospecting (c. 1960-70's). Where such information is not available the use of geophysical techniques, such as Ground Penetrating Radar (GPR) and electro-conductivity methods should then be considered.

It is noted that village settlements are frequently located on and around headlands for a range of reasons. This is certainly the case for Manning beaches, including Crowdy Head, Wallabi Point, Diamond Beach South, Red Head and Black Head villages. This tendency leads to a concentration of potential risk in locations where consultants have not been able, or prepared to describe the logical termination of hazard lines. The resulting gaps call into question subsequent planning areas derived from the primary lines.

To break this impasse without undue expenditure, an interim methodology is proposed. It comprises an evidenced-based approach based on detailed site inspection and interpretation. By following an agreed evidence trail it becomes possible to interpolate conditions within the transition from dune sands to rocky headland. The process aims to provide a conservative description of hazard lines, fit for the purpose of drafting planning areas and formulating other first level responses. It must be seen as a 'first pass' approach, an initial step in an adaptive improvement process for hazard description around headlands.

4.1 Site Evidence

The interpolation zone: is between 'known sand' and a rocky headland feature (termination). Known sand is estimated by site inspection in conjunction with the consultant's lines produced using the standard approach (see Section 2.0 above). This provides a conservative connection point to the consultant-produced lines. The headland boundary becomes the first significant outcropping of monolithic durable rock above the shoreline (i.e. greater than RL 3.0m AHD). The following levels of evidence were utilised:

1. Primary Points are observable rock outcroppings. These can be intermediate, but should be 'monolithic' with the headland feature.

2. Secondary Points are broken/weathered durable rock, dense heavy clays or indurated hard concretions.
3. Tertiary Points are interpreted subgrade depths inferred from geomorphology trends such as patterns of Holocene/Pleistocene deposition.

4.2 Interpolation Methodology

The Manning Valley CZMP utilises three hazard lines for the purposes of current and future coastal management. These relate to the three benchmark dates: **Immediate, 2060 and 2100** (see above). The approach is consistent with the former Great Lakes Council approach of setting a minimum 50 year planning horizon i.e. this was 2060 at commencement in 2010. The 2100 benchmark is also described as the upper bound of state and federal government policy. Revision of benchmark periods and sea level rise projections will be included as part of transitions to the Coastal Management Program format by 2021.

The **Interpolation Zone** will always be tied between the terminal headland outcropping (Primary Point) and a conservative estimation of the connection with full sand profile. Intermediate primary and secondary points are used to define the form of the immediate hazard line between these end points. Observation of soil/rock characteristics and depths are then used to adjust separation between benchmark time periods.

Red Head provides a good example of the use of site evidence to adjust the hazard lines produced by the consultants. **Figure 2** shows hazard lines originally derived by the consultant, Worley Parsons, on which a westerly deviation into a solid cliff face (RL ~18m AHD) can be seen. The lines eventually terminate over the top of the hard rock headland. Hazard line definition was seemingly based on an assumption of uniform sand, very evidently not the case even from aerial photographs. By comparison **Figure 3** shows adjusted lines reflecting the actual harder substrate observed around the headland. Hazard lines shown are **Immediate, 2060 and 2100** benchmarks. Whilst the adjustment has removed six properties from potential planning restriction it has also restored credibility by capturing the actual site conditions around the relict southern face of the headland.

5.0 Discussion

The shortcomings of the Nielsen Slope Stability approach are recognised across the industry; in particular the time-dependent failure forms associated with higher dune systems (Angus Gordon, pers. comm.). Similarly, the reluctance to apply it to shallow soil/rock conditions is regarded as a significant limitation. Application to shallow/harder materials opens questions about more complicated slope failure models. Nevertheless, the Nielsen model remains an 'industry standard' which is recognised as a conservative first-pass method capable of identifying potential problem areas for subsequent detailed investigation.

Therefore, the Nielsen Model serves a valuable purpose and is the first stage of an adaptive data improvement process. This approach is more cost-effective because subsequent investigation/iteration is directed to areas of obvious inconsistency, often in the vicinity of settled headlands. It is regarded as incumbent upon scientists and engineers to take reasonable actions in the face of uncertainty, in order to commence the adaptive improvement process.

The approach to site interpretation is very similar to that employed by soil scientists and engineers in land capability assessment, soils mapping and structural site classification (AS/NZS 2870). In this approach limited physical data is extended by inference based upon related evidence both direct and indirect.

Slope stability assessment on shallow/harder country is problematic but not intractable. Angle of repose, hence the Nielsen Model, only applies to granular soils and has no direct correlation for clay soils (incl. silty/sandy clays, etc.). Difference in hazard line spacing (between benchmark projections) will more reliably respond to decreasing soil depth (increasing influence of rock substrate) in slope stability. It is primary the soil depth factor that is applied to interpreting hazard lines in the approach to rocky headlands within this Manning Region CZMP.

Considering the projected impacts of sea level rise and the associated encroachment of coastal processes into harder/shallower country, it is believed that refinement/supplementation of current first-pass methods for these areas needs to be advanced in the medium term at least.



Figure 2: Red Head Hazard Lines (Worley Parsons, 2010)

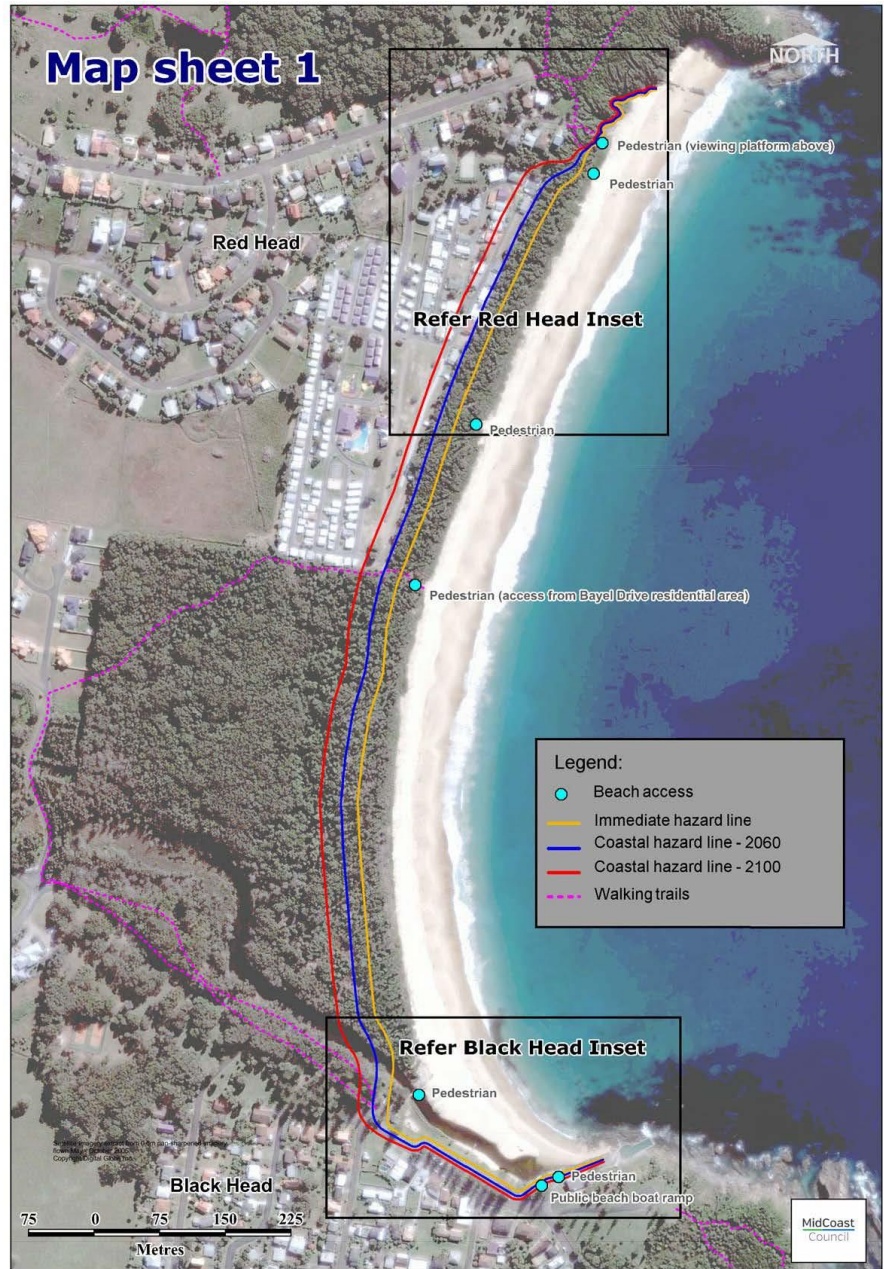


Figure 3: Adjusted Red Head Hazard Lines

6.0 Conclusion

The application of conservative interpretation regarding stability behaviour on mixed soil/rock slopes can provide a reasonable method for supplementing a first-pass method like the Nielsen Model for uniform sand. Sources of information utilised for the determination of hazard lines adjacent to headland features include: aerial photographs, creek bank profiles, seepage and drainage patterns, soils and vegetation as well as roadworks and other excavations. This information is, to varying degrees observable in the landscape and should generally be included as a field proofing in the finalisation of sand lines derived using the Nielsen Model.

In the case of the headlands assessed for the Manning Valley CZMP, the risk level for this approach is considered very low, both in terms of the

physical hazard as well as **organisational hazard**. Generally, through cautious field observation and interpretation the potential number of properties affected has been reduced considerably whilst enhancing integrity/value of the overall hazard definition project.

The recognition and inclusion of conditions that can be readily observed in the field serves to increase the overall credibility of related coastal adaptation measures in the public's eye. Geophysical methods can subsequently be deployed where justified, to refine hazard lines and the understanding of shoreline stability in specific areas. It is intended to seek funding for this purpose as part of the Coastal Management Program transition by 2021.

APPENDIX 3 - MANAGEMENT ACTIONS

Management Actions from Section 2

This Appendix displays the Actions from Section 2 in an alternative layout.

It is understood that a combination of management actions are required when coping with the challenges of coastal processes.

The following table outlines actions that MidCoast Council will undertake (*where indicated, Council will work with identified agency in relation to action*). (*Where indicated, "in-kind cost" refers to funding to undertake this action from within Council's general revenue budget. Where indicated "grant funding" refers to funding being applied from an external grant funding source. No specific funding source has been identified as not to restrict potential funding sources, however, the OEH Coast and Estuary grants have been identified as a main source of grant funding potential*).

Immediate Action #	Immediate Action	Location
IA1	Commission a feasibility study focused on the redesign of the structure on the ocean side of Black Head SLSC to improve its resilience. (<i>est. \$25,000 grant funding</i>)	<ul style="list-style-type: none">Nine Mile / Black Head / Red Head Beaches
IA2	Liaise with Black Head SLSC committee to explain coastal hazard processes, management actions and outcomes of feasibility study. (<i>MCC Community Spaces budget</i>)	<ul style="list-style-type: none">Nine Mile / Black Head / Red Head Beaches
IA3	Commission a specific Emergency Action Plan for Black Head Beach formal access points, Black Head Rock Pool, Black Head Lagoon Pedestrian Bridge, Black Head park facilities and Red Head formal beach access points. Focus on re-establishing public access post storm event. Where public infrastructure is on land or under the ownership/management of DoI Crown Lands & Water, consult with DoI Crown Lands & Water as part of assessment and planning processes and in accordance with MoU (where applicable). Prior to the implementation of any actions, there may be the need to obtain authorisations under the Crown Lands (<i>est. \$15,000 grant funding</i>)	<ul style="list-style-type: none">Nine Mile / Black Head / Red Head Beaches
IA4	Manage Black Head Lagoon, Reserve and stormwater outlets in accordance with the Black Head Lagoon Entrance Plan of Management 2008. (<i>MCC Projects & Engineering budget. New Capital may require grant funding</i>)	<ul style="list-style-type: none">Nine Mile / Black Head / Red Head Beaches
IA5	Review flood mapping to establish potential impacts on Black Head Lagoon. (<i>MCC Projects & Engineering budget</i>)	<ul style="list-style-type: none">Nine Mile / Black Head / Red Head Beaches
IA6	Commence discussions in relation to the future management of the sewer mains and sewer pumping station adjacent to Black Head Lagoon. (<i>MCC Water Services budget</i>)	<ul style="list-style-type: none">Nine Mile / Black Head / Red Head Beaches

Immediate Action #	Immediate Action	Location
IA7	Engage a contractor to develop and implement a beach condition monitoring program. To focus on sand volume changes, potential wave run up impacts. Aim to improve data for future revision of coastal hazards studies and trigger points for Emergency Action Plans. <i>(est. \$45 - 60,000 grant funding)</i>	<ul style="list-style-type: none"> • Nine Mile / Black Head / Red Head Beaches • Diamond Beach • Saltwater to Wallabi Point • Harrington Beach, Harrington Inlet, to Crowdy Head and Crowdy Harbour
IA8	Commence review and implementation of Council LEP and DCP in relation to Coastal Risk Planning and management. Review to consider and align with State Environmental Planning Policy - Coastal Management and the Coastal Management Act 2016. <i>(MCC Strategic Planning budget)</i>	<ul style="list-style-type: none"> • Nine Mile / Black Head / Red Head Beaches • Diamond Beach • Saltwater to Wallabi Point • Harrington Beach, Harrington Inlet, to Crowdy Head and Crowdy Harbour
IA9	Develop assessment criteria for the replacement or upgrade of public infrastructure in the study area. Assessment to determine requirements for construction of new or replacement of existing structures with appropriate materials. Consideration to be given to the requirement for removal of structures due to impact of coastal processes. Where public infrastructure is on land or under the ownership/management of DoI Crown Lands & Water, consult with Nine Mile / Black Head / Red Head Beaches DoI Crown Lands & Water as part of assessment and planning processes and in accordance with MoU (where applicable). Prior to the implementation of any actions, there may be the need to obtain authorisations under the Crown Lands <i>(est. \$60,000 grant funding)</i>	<ul style="list-style-type: none"> • Nine Mile / Black Head / Red Head Beaches • Diamond Beach • Saltwater to Wallabi Point • Harrington Beach, Harrington Inlet, to Crowdy Head and Crowdy Harbour
IA10	Working collaboratively with residents and relevant agencies e.g. DoI Crown Lands & Water to reduce the number of informal beach accesses along the coast through dune restoration programs, aimed at revegetating with native species. Liaison with adjoining property owners in relation to the need to use formalised access points. <i>(grant funding cost est. to be confirmed) (liaise with Greater Taree Holiday and Leisure Reserves Reserve Trust)</i>	<ul style="list-style-type: none"> • Nine Mile / Black Head / Red Head Beaches • Diamond Beach • Saltwater to Wallabi Point • Harrington Beach, Harrington Inlet, to Crowdy Head and Crowdy Harbour
IA11	Develop and implement weed management action plan with relevant land managers. With the aim to reduce weed invasion to improve native vegetation resilience. <i>(MCC Natural Systems budget)</i>	<ul style="list-style-type: none"> • Nine Mile / Black Head / Red Head Beaches • Diamond Beach • Saltwater to Wallabi Point • Harrington Beach, Harrington Inlet, to Crowdy Head and Crowdy Harbour

Immediate Action #	Immediate Action	Location
IA12	Continue to enhance strong partnership with the Hallidays Point Landcare, the DoI Crown Lands & Water, NSW National Parks & Wildlife Service and the Office of Environment and Heritage. <i>(MCC Natural Systems budget)</i>	<ul style="list-style-type: none"> • Nine Mile / Black Head / Red Head Beaches • Diamond Beach • Saltwater to Wallabi Point • Harrington Beach, Harrington Inlet, to Crowdy Head and Crowdy Harbour
IA13	Develop and implement community education program to support above listed works. <i>(grant funding cost est. to be confirmed)</i>	<ul style="list-style-type: none"> • Nine Mile / Black Head / Red Head Beaches • Harrington Beach, Harrington Inlet, to Crowdy Head and Crowdy Harbour
IA14	Commence liaisons with Big 4 Holiday Park regarding their management of identified asses and future management of the Holiday Park including asset protection zones <i>(MCC Natural Systems budget)</i> .	<ul style="list-style-type: none"> • Nine Mile / Black Head / Red Head Beaches • Diamond Beach • Saltwater to Wallabi Point
IA15	Review CZMP actions by 2021 <i>(grant funding cost est. to be confirmed)</i>	<ul style="list-style-type: none"> • Nine Mile / Black Head / Red Head Beaches • Diamond Beach • Saltwater to Wallabi Point • Harrington Beach, Harrington Inlet, to Crowdy Head and Crowdy Harbour
IA16	Develop and implement education packages focused on private properties at risk of coastal process. Packages should clearly articulate options private residents can undertake for the management of their properties in accordance with new <i>Coastal Management Act 2016</i> provisions. <i>(grant funding cost est. to be confirmed)</i>	<ul style="list-style-type: none"> • Diamond Beach
IA17	Review existing Emergency Action Plan for Jubilee Pde and Diamond Beach formal beach access points. If necessary, create new version retaining focus on re-establishing public access post storm events. Where public infrastructure is on land or under the ownership/management of DoI Crown Lands & Water, consult with DoI Crown Lands & Water as part of assessment and planning processes and in accordance with MoU (where applicable). Prior to the implementation of any actions, there may be the need to obtain authorisations under the Crown Lands. <i>(est. \$15,000 grant funding)</i>	<ul style="list-style-type: none"> • Diamond Beach

Immediate Action #	Immediate Action	Location
IA18	Review management plans for foreshore reserves and stormwater outlets, update if necessary (<i>MCC Transport Assets Budget</i>) (may require input from <i>Dol Crown Lands & Water</i>)	<ul style="list-style-type: none"> • Diamond Beach • Saltwater to Wallabi Point • Harrington Beach, Harrington Inlet, to Crowdy Head and Crowdy Harbour
IA19	Review potential impacts on stormwater system within identified area, include in management plans if haven't been previously recorded. (<i>MCC Transport Assets Budget</i>)	<ul style="list-style-type: none"> • Diamond Beach • Saltwater to Wallabi Point • Harrington Beach, Harrington Inlet, to Crowdy Head and Crowdy Harbour
IA20	Review future management of the water mains and sewerage pumping stations in Diamond Beach (<i>MCC Water Services budget</i>)	<ul style="list-style-type: none"> • Diamond Beach • Saltwater to Wallabi Point
IA21	Review Emergency Action Plan for stormwater outlet, formal beach access points, Saltwater Road and car park. Update if necessary. Where public infrastructure is on land or under the ownership/management of Dol Crown Lands & Water, consult with Dol Crown Lands & Water as part of assessment and planning processes and in accordance with MoU (where applicable). Prior to the implementation of any actions, there may be the need to obtain authorisations under the Crown Lands (<i>est. \$15,000 grant funding</i>)	<ul style="list-style-type: none"> • Saltwater to Wallabi Point
IA22	Review Emergency Action Plan for public access points and walking trails update as necessary. Where public infrastructure is on land or under the ownership/management of Dol Crown Lands & Water, consult with Dol Crown Lands & Water as part of assessment and planning processes and in accordance with MoU (where applicable). Prior to the implementation of any actions, there may be the need to obtain authorisations under the Crown Lands. (<i>est. \$15,000 grant funding</i>)	<ul style="list-style-type: none"> • Harrington Beach, Harrington Inlet, to Crowdy Head and Crowdy Harbour
IA23	Construction of an off-road shared pathway of 3m wide and 6km long between Harrington Big 4 Caravan Park to Crowdy Head Harbour (<i>est. \$2.3m S94 and grant funding</i> [this item is included in the Greater Taree S94 Contributions Plan 2016 - Greater Taree Works Schedule – GT4]). In addition, consents and authorisations may be required under other legislation, including <i>Native Title Act 1993</i> (Cth) and <i>Aboriginal Land Rights Act 1983</i> (NSW)	<ul style="list-style-type: none"> • Harrington Beach, Harrington Inlet, to Crowdy Head and Crowdy Harbour
IA24	Review and implement maintenance dredging program within the Harrington Inlet, main channel, Harrington Waters Marina (incl boat ramp area), Harrington Lagoon, Harrington Backchannel and Crowdy Bay Harbour in accordance with the <i>Manning River Maintenance Dredging Strategy 2010</i> . Liaise with relevant public authorities as required. (<i>grant funding cost est. to be confirmed</i>)	<ul style="list-style-type: none"> • Harrington Beach, Harrington Inlet, to Crowdy Head and Crowdy Harbour

Immediate Action #	Immediate Action	Location
IA25	Liaise with the DoI Crown Lands & Water in relation to the maintenance program for the Harrington and Crowdy Bay Harbour breakwalls and training walls in relation to the long term management of Council assets adjacent to the identified Crown Lands assets. <i>(MCC Natural Systems budget)</i>	<ul style="list-style-type: none"><li data-bbox="1525 181 2063 245">• Harrington Beach, Harrington Inlet, to Crowdy Head and Crowdy Harbour
IA26	Review existing Manning Entrance and Harrington Beach State Parks Memorandum of Understanding (2012) between NSW Trade & Investment - Crown Lands and the Greater Taree City Council. Mou for these State parks to be under joint Management between DoI Crown Lands & Water and MCC. Responsibilities for actions and overall strategic approach to managing the coastal zone should be consistent with this CZMP. <i>(MCC Natural Systems budget) (DoI Crown Lands & Water)</i>	<ul style="list-style-type: none"><li data-bbox="1525 379 2063 443">• Harrington Beach, Harrington Inlet, to Crowdy Head and Crowdy Harbour

Medium / Long Action #	Medium / Long Action	Location
MLA1	Review data gathered from available science, including the beach monitoring data, to ensure CZMP / CMP actions are up to date and relevant. <i>(MCC Natural Systems budget partial grant funding if required)</i>	<ul style="list-style-type: none"> • Nine Mile / Black Head / Red Head Beaches • Diamond Beach • Saltwater to Wallabi Point • Harrington Beach, Harrington Inlet, to Crowdy Head and Crowdy Harbour
MLA2	Continue liaisons with Big 4 Holiday Park regarding their management of identified asses and future management of the Holiday Park and asset protection zones. <i>(MCC Natural Systems budget)</i>	<ul style="list-style-type: none"> • Nine Mile / Black Head / Red Head Beaches
MLA3	Continue to review and update Council LEP and DCP in relation to coastal risk planning and management. Review to consider and align with any changes or amendments to State Environmental Planning Policy (Coastal Management) and the <i>Coastal Management Act 2016</i> . <i>(MCC Strategic Planning Budget)</i>	<ul style="list-style-type: none"> • Nine Mile / Black Head / Red Head Beaches • Diamond Beach • Saltwater to Wallabi Point • Harrington Beach, Harrington Inlet, to Crowdy Head and Crowdy Harbour
MLA4	Review management of Main Street Black Head (between Albert and Ocean Street). <i>(MCC Projects & Engineering budget)</i>	<ul style="list-style-type: none"> • Nine Mile / Black Head / Red Head Beaches
MLA5	Continue to implement management options towards retention, replacement or removal of public infrastructure, as per findings from internal assessment of assets in hazard zones. <i>(MCC Community Spaces budget partial grant funding if required)</i>	<ul style="list-style-type: none"> • Nine Mile / Black Head / Red Head Beaches • Diamond Beach • Saltwater to Wallabi Point • Harrington Beach, Harrington Inlet, to Crowdy Head and Crowdy Harbour
MLA6	Review and update specific Emergency Action Plans, if necessary. <i>(est. \$15,000 grant funding)</i>	<ul style="list-style-type: none"> • Nine Mile / Black Head / Red Head Beaches • Saltwater to Wallabi Point
MLA7	Develop long term plans for management of the sewer mains and sewerage pumping station adjacent to Black Head Lagoon. <i>(MCC Water Services budget)</i>	<ul style="list-style-type: none"> • Nine Mile / Black Head / Red Head Beaches

Medium / Long Action #	Medium / Long Action	Location
MLA8	Implement actions as recommended by feasibility study into the redesign of the structure on the ocean side of Black Head SLSC to improve its resilience. Continue to liaise with the Black Head SLSC committee in relation to management options, beach access and storm responses. <i>(grant funding cost est. to be confirmed)</i>	<ul style="list-style-type: none"> • Nine Mile / Black Head / Red Head Beaches
MLA9	Develop Asset Management Plan for Black Head SLSC and Black Head Rock pool in relation to impacts from predicated coastal processes. AMP should consider balance point of replacement of and removal of asset. . <i>(MCC Property & Commercial services budget partial grant funding if required)</i>	<ul style="list-style-type: none"> • Nine Mile / Black Head / Red Head Beaches
MLA10	Develop a Coastal Natural Asset Strategy focusing on bush regeneration and weed control for the continued enhancement of biodiversity in the coastal zone. <i>(MCC Natural Systems budget partial grant funding if required)</i>	<ul style="list-style-type: none"> • Nine Mile / Black Head / Red Head Beaches • Diamond Beach • Saltwater to Wallabi Point • Harrington Beach, Harrington Inlet, to Crowdy Head and Crowdy Harbour
MLA11	Regularly review education packages focused on private properties at risk of coastal process. Packages should clearly articulate options private residents can undertake for the management of their properties. <i>(MCC Natural Systems budget)</i>	<ul style="list-style-type: none"> • Nine Mile / Black Head / Red Head Beaches • Diamond Beach
MLA12	Commence liaisons with Diamond Beach Resort and Ramada Resort regarding their management of identified asses and future management of their properties. <i>(MCC Natural Systems budget)</i>	<ul style="list-style-type: none"> • Diamond Beach
MLA13	Review and update of Emergency Action Plan for Diamond Beach and Jubilee Pde. <i>(est. \$15,000 grant funding)</i>	<ul style="list-style-type: none"> • Diamond Beach
MLA14	Review management of the water mains and sewerage pumping stations in Diamond Beach. <i>(MCC Water Services budget)</i>	<ul style="list-style-type: none"> • Diamond Beach • Saltwater to Wallabi Point
MLA15	Develop management plan for Saltwater Road and carpark. Plan to outline actions for the short term retention and ultimate removal of road Additional investigation to consider relocation of the road to the west (through private property and/or National Park). <i>(MCC Natural Systems and Projects & Engineering budget partial grant funding if required)</i>	<ul style="list-style-type: none"> • Saltwater to Wallabi Point

Medium / Long Action #	Medium / Long Action	Location
MLA16	Review and update specific Emergency Action Plans for public access points, including boat ramps, walking trails and formal beach access points. Where public infrastructure is on land or under the ownership/management of DoI Crown Lands & Water, consult with DoI Crown Lands & Water as part of assessment and planning processes and in accordance with MoU (where applicable). Prior to the implementation of any actions, there may be the need to obtain authorisations under the Crown Lands. <i>(est. \$15,000 grant funding)</i>	<ul style="list-style-type: none"> Harrington Beach, Harrington Inlet, to Crowdy Head and Crowdy Harbour
MLA17	Liaise with DoI Crown Lands & Water in relation to their break wall and training walls maintenance program in relation to the long term management of Council assets adjacent to the identified Crown Lands assets. <i>(MCC Natural Systems)</i>	<ul style="list-style-type: none"> Harrington Beach, Harrington Inlet, to Crowdy Head and Crowdy Harbour
MLA18	Investigate approvals pathways for formalising the surf club carpark and seek funding if the works are considered feasible. Subject to the availability of funding and planning approvals, design and implement the works (design should incorporate consideration of sea level rise). Seek funding to formalise surf club carpark – plan to accommodate sea level rise <i>(est. \$400,000 grant funding)</i> <i>(Harrington Beach State Park Trust)</i>	<ul style="list-style-type: none"> Harrington Beach, Harrington Inlet, to Crowdy Head and Crowdy Harbour
MLA19	Liaise with DoI Crown Lands & Water, Harrington Beach State Park Trust, user groups and other key stakeholders in relation to future plans for Crowdy Bay Harbour and the public assets contained within. <i>(MCC Natural Systems budget)</i>	<ul style="list-style-type: none"> Harrington Beach, Harrington Inlet, to Crowdy Head and Crowdy Harbour
MLA20	Through the Harrington Beach State Park Trust, consult with the community and stakeholders concerning future plans for the area around the lighthouse, including construction of a whale watching platform <i>(MCC Community Spaces budget and grant funding \$20,000)</i>	<ul style="list-style-type: none"> Harrington Beach, Harrington Inlet, to Crowdy Head and Crowdy Harbour